November 1983 \$2.95

MAGAZINE

Color Computer & TDP-100™ Users

GRAPHICS

- Barden
- **Bjork**
- Commander ...and others

CD34*44145ROWE1762*KO
A ROWEN
1762 KING JAMES PKWY
WESTLAKE
OH 44 OH 44145

™ Tandy Corporation

Computerware Proudly Presents...

from our long list of Color Computer software for home, work, business and programmers . . .



Your Lady Bug hussles thru an intricate maze of barriers & turnstiles, avoiding enemy bugs & skulls.

Cass \$26.95

Disk \$29.95



You must dive thru shark infested waters to get the treasure. Timing & strategy are crucial . . .

Cass \$24.95

Disk \$27.95



Full feature modem software.Load & save from RAM Buffer, Macros, any duplex or parity, much more ...

Cass \$29.95 Disk \$39.95

Synther · 7

Turn your keyboard into a musical instrument with a digital synthesizer.

Cass \$21.95

Disk \$24.95



New! Improved! The most realistic graphics arcade game ever!

Cass \$24.95

Disk \$27.95



Complete word processor & program editor with 51 x 24 upper & lower case display.

Disk \$49.95 Many new features!



Centipedes & katerpillars are tame compared to the challenge & aggression in this great game!

Cass \$24.95

Disk \$27.95



Your Rail Runner must scurry over busy tracks dodging trains & handcars to rescue the hoboes!

Cass \$24.95 Disk \$27.95



Modifies screen display to 51 x 24 for BASIC & your other software.

Cass \$24.95

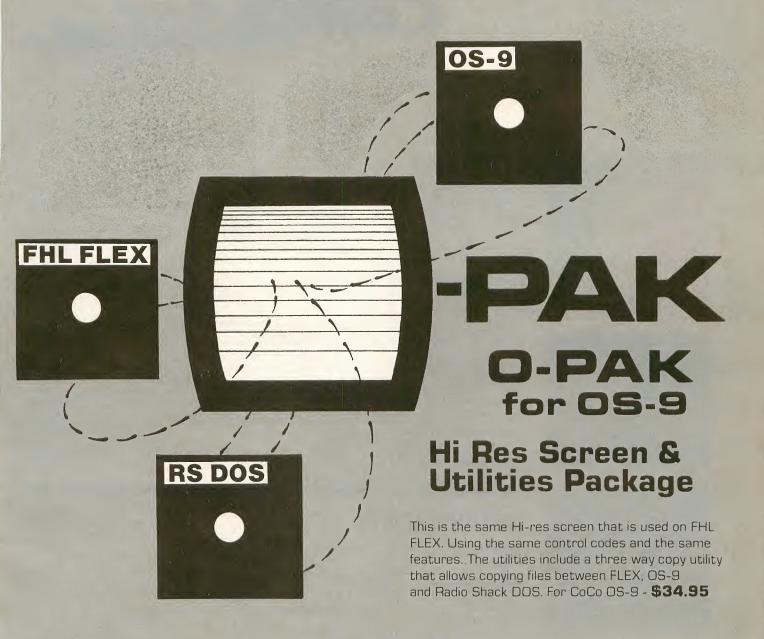
Disk \$27.95

Add shipping of \$2 surface or \$5 air/Canada. Visa & MasterCard accepted. Dealer inquiries invited. Computerware® is a trademark of Computerware®



P.O. Box 668, Encinitas, CA 92024 (619) 436-3512

The world's largest manufacturer of software presents . . .

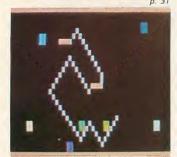




THE REGENCY TOWER • SUITE 215 • 770 JAMES ST. • SYRACUSE, NY 13203 PHONE (315)474-7856 • TELEX 646740 ISSN 0736-9492









FEATURES

15/Super Spiro! by Jake Commander Go "beyond reality" into super- and hyper-spirographics.	(Graphics)
20/Color Computing for Kids by Jean Plesser Send your computer into loops get it working on math, too.	(Education)
31/Star by David Lauta A short, sweet, graphics treasure.	(Graphics)
34/Sorcerer's Puzzles by Richard Ramella Oh no! The sorcerer has been kidnapped! Quick! Solve these puzzles!	(Game)
46/Slither by Stephen P. Allen An eight-speed machine language version renews the challenge.	(Game)
65/Unforgettable Characters by William Barden Jr. Put user-definable graphics characters into your favorite machine.	(Graphics)
83/My MC-10 Speaks ML! by Doug McFadden and Tim Kelley Machine language on the MC-10? What won't this little machine do?	(General)
90/Custom Color by Dennis Kitsz Part I of the most incredible computer music software you ever heard.	(Tutorial)
96/One-finger Hexload by Jim Norman Save time storing and editing hex byte lists.	(Utility)
104/Graphics? Yes! Part II by Scott Bain and Andrea Chartier Draw lines and circles; learn new commands.	(Graphics)

DEPARTMENTS

4/PEEK (1	12,83)
-----------	--------

6/INKEY\$

74/GOTO SCHOOL

100/DEFUSR

111/REVIEW\$

Micron eye, Astro Blast, Colorkit, Cosmic Clones, and more.

120/NEW:PRODUCT\$

126/FOR...NEXT (12,83)

128/END OF FILE

over

Graphics by William A. Giese

ABC membership applied for.

THE COLOR COMPUTER MAGAZINE is published monthly by Computer Publishing Co., Inc., Highland Mill, Camden, ME 04843. James S. Povec–President, Michael Perlis–Executive Vice President, H. John Delile–Treasurer

Subscriptions are \$23.97 for twelve issues. User Group subscription rates available on request. Outside U.S.A. add \$10 for extra postage. Dealer inquiries: Send to Marian Savage, TCCM, Highland Mill, Camden, ME 04843. (207) 236-9621.

POSTMASTER: Please send changes of address to The Color Computer Magazine, P.O. Box 468, Hasbrouck Heights, NJ 07604. Application for mailing at second class rates pending at Camden, Maine, and additional mailing offices.

PRCADE. QUALITY ALOSO JOINES



Hamburgers, fries, drinks and other fastfoods are chased by chattering teeth. Can you stop them before you go...WACKO? Three levels of play from beginner to expert. This is number one for fun. 32K Disk \$24.95



DESERT PATROL

Armed with laser cannons guide your desert vehicle past obstacles while avoiding enemy fire. Watch out not to run out of fuel. Five levels of play.

32K Disk \$26.95

32K Cass. \$24.95



एडराइएएएडरा

Push blocks of ice to crush giant mosquitos and avoid getting stung long enough to get them all. Three levels with graphics so real you'll want your fly swatter. Don't miss this arcade classic.

32K Disk \$26.95

32K Cass. \$24.95



You are in a foodfight against the evil chefs. Can you eat the icecream cone before it melts? Fast paced arcade action and sound make this game unforgettable. Fifteen screens and ten levels of play.

32 K Disk \$27.95

32K Cass. \$25.95

All games 32K disk or cassette are written completely in machine language. Highest resolution artifact graphics and spectacular sound effects are just two of the exceptional features you will find. Each game records high score and multiple skill levels with play features comparable to current arcade games.

Other works by this author

Rainbow 7-83

"Not only is the action portion...spectacular, but the game is a visual triumph as well...with color rivaling most coin-op video games."

Order Line (201) 773-3474 - 24 Hours
ORDERS SHIPPED WITHIN 24 HOURS BY FIRST CLASS MAIL, POSTAGE PAID.

Order now and enjoy this new generation of video games for your Color Computer.

Arcade Animation, Inc.

21 The Fairway · Upper Montclair, N.J. 07043

* Dealers inquires invited* Circle No. 3 on Reader Service Card

- PEEK (11,83).

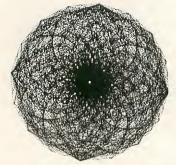


f any of you have ever been to a computer graphics show, for instance the annual SiGraph, you probably came away like me: stars in eyes, jaw dropped open in amazement, and totally discontented with your own micro's graphics ca-

pabilities. If you've never been to a graphics show, imagine hour after hour of graphics that surpass some of the neat things you've seen on TV — Levi's ads, car ads, etc. In fact, many programmers with entries in graphics shows also wrote the graphics pieces you've seen in ads and movies.

We can't expect our micros with their 64K memories to produce some of the wonders the big boys produce (can we?). But, oh, to be able to do something just a little spectacular, a little out-of-the-ordinary... Shoot, if talented early photographers could do as well or better with their pin-hole box cameras as modern-day photographers with their expensive, highly technical equipment, couldn't a talented micro user produce something *really* amazing if he just worked at it hard enough?

I guess a fairly large number of Color Computer programmers have thought the same way. And there are some pretty interesting graphics out there — lots are just mediocre, but some are truly superlative. One programmer who has been steadily urged on by his memories of SiGraph is our own Jake Commander. It inspired him to create Spiromania two years ago for the TRS-80 Model III; today he has created Super Spiros for the Color Computer (GOTO 15). If this doesn't inspire you, you'll have to face up to it — you simply are no artist.



Beginners who need more help developing their graphics procedures should GOTO 104. Scott Bain and Andrea Chartier continue a wonderful job explaining basic graphics techniques in Part II of "Graphics? Yes!"

Feeling frivolous? A little bit arty? Want to amaze your friends and snazz up your programs? GOTO 31; David Lauta shows you how to produce a star of remarkable beauty.

Straight and steady; calm and commanding; practical and pragmatic; GOTO 65 for Part I of Bill Barden's graphics challenge.

Before we leave the subject of graphics, I'd like to mention that next month we'll have a graphics article by Steve Bjork with Mark Randall on game graphics — it didn't quite make our November deadline, but you surely won't want to miss it!

Oh, no! Sorcerer Goldberg has been kidnapped and Poke and Sunflower have to find him and free him. Bob, the Sorcerer's twisted major domo, is too busy trying to deplete the raspberry seltzer supply to help. Can you solve the puzzles? GOTO 34!

Kids, GOTO 20 for a new lesson on your Color Computer and some Thanksgiving fun. Educators, GOTO 74 for a look into what's happening in the educational software market.

My MC-10 speaks machine language — does yours? GOTO 78 to find out how to teach it a new language.

Questions? Questions? We have answers. GOTO 100 — your question may be answered this month in DEFUSR.

Machine language programs can be troublesome to enter—especially if you're a beginner. Here's numerical memory entering to make it easier: One-Finger Hex load (GOTO 96).

When I was a kid, snakes were a real fascination. Now I'm not a kid, snakes aren't quite so fascinating — at least, they weren't 'til Slither came along. Slither away a few days of good game-playing (GOTO 46).

A brisk autumn wind is blowing, shrieking softly outside your door. It's evening; your study is warm from the hearth fire, a candle flickers invitingly on the chair side table. A good book and a comfortable chair and hassock await. Pour some brandy into a snifter and settle down for a good read. Oh — something's missing: a little soft music, perhaps? Turn on your Color Computer and be transported by *good*, four-voice compositions. GOTO 90 for Part I of Dennis Kitsz' music on the Color Computer.

One final thing I'd like you to look forward to — next month we'll have a preview article on robotics and the Color Computer. Let me quote the author of the article: "...we take a look at the recent marriage of our machine and Topo, a 33-pound robot made by Androbot in Sunnyvale, CA. Until recently Topo has interfaced mainly with Apple IIs. This summer a couple of midwestern computerists took it upon themselves to design an interface for the Color Computer, a development that opens a whole new arena for all of us." You won't want to miss it!

— D.M., Managing Editor



Telewriter-64 the Color Computer Word Processor

- 3 display formats: 51/64/85 columns × 24 lines
- **■** True lower case characters
- User-friendly full-screen editor
- Right justification
- Easy hyphenation
- Drives any printer
- Embedded format and control codes
- Runs in 16K, 32K, or 64K
- Menu-driven disk and cassette I/O
- No hardware modifications required

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

...one of the best programs for the Color Computer I have seen...

— Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to
Telewriter. Not just bells and whistles, but
major features that give you total control over
your writing. We call this new supercharged
version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51×24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, all on the screen at one time. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION One outstanding advantage of the full-width

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dotgraphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette autoretry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

...truly a state of the art word processor...
outstanding in every respect.
— The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs \$49.95 on cassette, \$59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)
To order, send check or money order to:

Cognitec 704 N. Nob Ave. Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add \$2 for shipping. Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Televriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners: send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc.

All letters are subject to editing for space considerations.



INKEYS

The Color Computer Magazine **Highland Mill** Camden, ME 04843

Piracy: Some Solutions

I would like to voice some comments and suggestions re: "End of File," August, 1983. Your topic of software piracy and user groups really hit home, since I am attempting to organize a user group in northern San Diego County. This job presents several problems, not the least of which is how a user group confronts software piracy. The choice seems black and white: either a group will abstain from piracy or everyone will come to a meeting, color tape copy in hand. The latter is understandably horrifying to any software author or distributor. Unfortunately, it is also hard, if not impossible, to abstain from piracy under current conditions. Any time I part from my hard earned (and at 16 it is especially hard earned) money I always wish there was a cheaper way to get what I want.

Piracy offers such an easy way out, no money, no hassle, just grab a friend and get a copy of the new game or that expensive "professional" business package. I wouldn't be so intrigued with breaking the law if I wasn't saving so much money. If games were only \$10 instead of \$24.95 I am certain I would save up and buy instead of copy. Unfortunately the "catch 22" syndrome stares out too badly to be ignored: a software company can easily lose its

shirt if it offers a deal on a good game and everyone plays "pass the copy." However, people will continue to pass the copy as long as software is so costly. With this realization, an experiment would be worthwhile just to test the public reaction. I would do it if I only could produce such a program (software distributors, authors - hint)

So far I have only offered one solution to this problem, but I hope these other solutions are also valid Protection is a touchy issue with consumers as well as software producers. The software industry must realize that protection is only a temporary and expensive solution; it will always be defeated. In addition, it stops the majority of honest software buyers from making legitimate copies of their software. All it promises to do is infuriate the potential return customer when their fabulous program greets them with a screenfull of I/O errors. However, in return the public must live up to the trust and responsibility each company has conceded when a software package is purchased. Remember that every legal copy you buy ensures the Color Computer's future. I know I don't want my biggest computer investment becoming worthless. Do you? My last solution is software support. This is where software houses should concentrate their resources, not in worthless protection schemes. Any software company could stop piracy by making the software itself worthless in comparison to the support the company gives it. "Over-support" is not **Beyond Games** a phrase in computerese, but it should be.

Everyone in the computer industry must realize that software piracy will be with us in some form or another as long as there are computers. It will never end but it can be controlled with the cooperation of the public and the software industry. I, for one, do not want the Color Computer software situation to become terminal. Software companies, software buvers, we must work together or our greatest asset will become our greatest loss. The Color Computer Magazine

readers, take a stand against software piracy: it really is up to you.

Don Bradford Solana Beach, CA

Praise for "Recover"

I would like to commend Kenneth Van Camp on his "Recover" program. I typed it in when I got the August issue and it has already saved my skin once or twice.

Paul Jensen Forest, Ontario

Machine for **Beginners**

I have enjoyed every issue of your magazine so far and plan on doing so for some time. It is almost everything I ever wanted and more. Please keep up the good work.

One area I would like to see better covered is machine language. I hope someday you will run a series on machine language for the absolute beginner.

Roger Van Hoover Bremerton, WA

You'll be happy to hear, Roger, that an introductory series to assembly language will begin early next year.

--- Eds.

I want to thank you for a great magazine. Yours is the first Color Computer magazine I have seen on the newsstands and it is really good to read about all the previously hidden information. It is also great to see all the new software being written for the Color Computer, taking it beyond the "game machine" image.

One such piece of software is "Filmastr," a data file program mentioned in your new products section. This is an excellent example of serious software with a professional touch at a reasonable price. In my opinion, the author has done a terrific job of combining the features of a powerful database program with the limitations of a tape based system and a 32 by 16 screen. The program is easy to use and the manual is very clear. If there were more programs of this quality available for the Color Computer, many more people would be attracted to this fine machine.

I also want to thank Bill Barden for opening the world of machine language programming for me. His clear and direct approach makes this very difficult subject as clear as can be. More please.

> Arthur Toomey Arlington, VA

Missing Routine

I enjoy your magazine, but I'm having trouble with Paul Detwiler's Basic DBM article (April, 1983). It seems that part of the program was edited out. The Line by Line shows Lines 9000 - 9999 as

to page 11



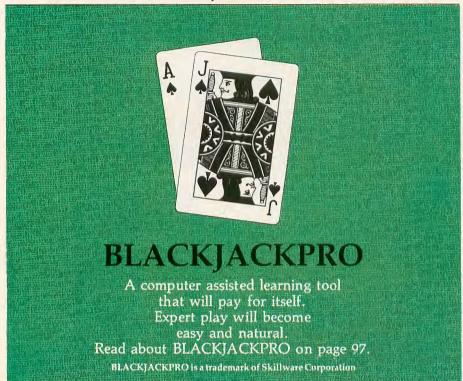
For Orders Only

We accept VISA, MASTERCARD Add 3% for shipping. NO C.O.D. All prices U.S. FUNDS. WA residents add 7.8% sales tax. 1-800-426-1830 except WA, AK, HI

Call or write for a complete catalog Business Office and Information Call: Office open 8:30—4:30 P.S.T. "FROGGIE" (FROGGER)
Race against the timer to get your
"Froggie" home. Get across the busy
highway and then the river using
logs, turtles and crocodiles to get
you there Escort the lady frog or
gobble up the fly for extra points
but look out for the otter, he's out to
get val

REQUIRES 32KRAM, JOYSTICKS
OPTIONAL
Cassette \$24.95 Diskette \$28.95

B P R K 0



K W R E





Computer familiarity and enjoyment from age 2!

"IT TALKS"

 Educational—promotes recognition of face parts and written words

- Create over 10.000 different faces
- Press any key to operate
- Name of face part "spoken" by software synthesized voice

16K Machine Language **Cassette** \$21.95 Georgians add 3% tax.

CHILDISH SOFTWARE

P.O. Box 985 Norcross, GA 30071

Editor Kerry Leichtman

Managing Editor Debra Marshall Proofreader Ann Hawks Assistant Editor Tom Juergens Production Manager Lynn Rognsvoog Senior Technical Editor Curtis P. Feigel Technical Editor Jamie Tietjen Information Editor Terry Kepner Dr. Paul Kimmelman Education Editors David Macali, Reviews Communications Editor **Contributing Editors**

Wayne Day William Barden Jr.

Jake Commander Dennis Kitsz Steve Bjork

Technical Consultants Paul Detwiler Steve Odneal

> Ad Production J.L. Patterson Art Production Susan Cramer

Claudia Diller Rod McCormick

Publisher James S. Povec **Director of Marketing** Carl Cramer

Advertising Director David J. Ezequelle (207) 236-9621

Highland Mill Camden, ME 04843

Advertising Scheduler Caron L. Taylor Circulation Director Lori A. Hellevia

Loriel Peters, Assistant **Bulk Sales** Marian Savage

Projects Director Michael Federle Controller John Delile

Pam Gertner, Assistant

Office Manager Bonnie Hellevig Typist Paula Whittet

©Computer Publishing Company, Inc., 1983. All rights reserved. Contents of this magazine may not be reproduced in whole or in part unless expressly authorized in writing by the Publisher. TRS-80 and Color Computer are trademarks of the Radio Shack Division of Tandy Corporation. TDP System 100 is a trademark of Tandy Corporation.

This magazine is published by The Computer Publishing Company who is solely responsible for its contents.

The Publisher assumes no responsibility for the return of un-solicited manuscripts, queries or artwork. Materials submit-ted to The Color Computer Magazine should be accom-panied by a stamped, self-addressed envelope. Editorial of-fices located at Highland Mill, Camden, ME 04843.

U.S.A. Newsstand distribution by Curtis Circulation Com-

Phototypography by Camden Type 'n Graphics — Camden, Maine; Printing by The Lane Press — Burlington, Vermont.

SUPER SCREEN

the Color Computer Supercharger



- A big 51 character by 24 line screen.
- Full upper and lower case characters.
- · Easily combine text with hi-res graphics.
- PRINT @ is completely functional on the big screen.
- The powerful ON ERROR GOTO is fully implemented.
- Auto-key repeat for greater keyboard convenience.
- Control codes for additional functions.
- · Works with 16K, 32K or 64K computers.
- Available on disc or cassette.

51 CHARACTER BY 24 LINE DISPLAY

Super Screen is a powerful, machine language program that significantly upgrades the performance and usefulness of 16K or greater, Extended and Disc Basic Color Computers. The standard Color Computer display screen is totally inadequate for serious, personal or business applications so Super Screen replaces it with a brand new, 51 character wide by 24 line screen including full upper and lower case characters. Instead of a confusing checkerboard appearance, you now have true lower case letters along with a screen that is capable of displaying 1224 characters. The difference is startling! Your computer takes on new dimensions and can easily handle lines of text that were simply too long and complex to display on the old screen.

COMBINE TEXT WITH HI-RES GRAPHICS

You can now write truly professional looking programs that combine text with hi-res graphics. Super Screen allows you to create graphics displays with the Basic LINE, DRAW and CIRCLE statements and then notate the graphics with descriptive text. You can even use PRINT @ if you wish for greater programming convenience. Super Screen's versatility will amaze you.

PRINT @ IS FULLY IMPLEMENTED

The PRINT @ statement is a varuable asset to the programmer when formatting text on the screen. The standard Color Computer will report an error if you specify a location higher than 511 but Super Screen allows locations all the way to 1223! You get a big screen and a powerful formatting tool as well. Of course, Super Screen also supports the CLS command allowing you to clear the big screen using standard Basic syntax.

ON ERROR GOTO

That's right! Super Screen gives you a full implementation of ON ERROR GOTO including the ERR and ERL functions. Now you can trap errors and take corrective action to prevent crashed programs and lost data using the same standard syntax as other computers. The ON ERROR GOTO capability overcomes a serious deficiency of Color Computer Basic and greatly improves your capability to handle sophisticated tasks. All well written, 'user friendly' programs use error trapping techniques and yours can too! Now that's power!

AUTO KEY REPEAT

No more frustration as you edit a long line in your Basic program; just hold the space bar down and automatically step to the desired position in the line. Need a line of asterisks? Hold the key down and auto repeat will give them to you. Those of you who spend many hours at your keyboard will appreciate this outstanding addition to Super Screen's long list of impressive capabilities.

CONTROL CODES FOR ADDITIONAL FUNCTIONS

Super Screen recognizes several special control code characters that allow selection of block or underline, solid or blinking cursor and other functions. You can 'Home up' the cursor or you may erase from the cursor to the end of a line or to the end of the screen just like many other computers. These special codes give you an extra dimension of versatility and convenience that put Super Screen in a class by itself.

AND MORE GOOD NEWS...

Super Screen comes with complete, well detailed instructions and is available on cassette or disc. It adjusts automatically to any 16K or greater, Extended or Disc Basic Color Computer or TDP-100 and uses only 2K of memory in addition to the screen memory reserved during power up. Guaranteed to be the most frequently used program in your software library...once you use it, you won't be without it! Super Screen's low price will really please you; only \$29.95 on cassette or \$32.95 on disc!



Mark Data Products

24001 ALICIA PKWY., NO. 207 • MISSION VIEJO, CA 92691 • (714) 768-1551

All Orders: Please add \$2.00 shipping and handling in the continental U.S. All others, add air shipping and \$3.00 handling. California residents add 6% sales tax. Foreign orders please remit U.S. funds. Software authors—contact us for exciting program marketing details.







32K MACHINE LANGUAGE **TAPE \$27.95 DISK \$30.95**



We've done it again! You thought The King was great? Wait 'til you see this!! Outstanding high resolution graphics, tremendous sound make this "Joust" type game a must for your software collection. As you fly from cloud to cloud you will enjoy sky high excitement dealing with the challenges presented to you by this newest release by Tom Mix Software.

By Rugby Circle

Circle No. 7 on Reader Service Card



OM MIX SOFTWARE 3424 COLLEGE N.E.

GRAND RAPIDS, MI 49505

To Order Call 364-4791 To Place Orders After 5:00 P.M. Call Our BBS At (616)364-8217

 ADD \$1.00 POSTAGE & HANDLING TOP ROYALTIES PAID MICHIGAN RESIDENTS ADD 4% SALES TAX. LOOKING FOR NEW SOFTWARE



ARCADE ACTION GAMES



from page 6

the loading routine. After Line 9120, a cartoon appears where the rest of the Listing should be. In the July issue, End of File lists an indexing bug, "Insert Q=Q-1 in Line 9220." Was this supposed to be part of Line 9120, so the line would read 9120 CLOSE#-1: Q=Q-1: GOTO 1000, or is some of the Listing missing?

The program jumps from Line 6940 to 8000, while all other line breaks occur at even thousands. Line 110 calls for subroutine 7000. Where is it?

Richard King 5810 Old Spanish Trail #9 Houston, TX 77023

Yes, Richard, the indexing bug we listed was for Line 9120, and no, the Listing is complete. The missing subroutine wasn't written into the program. Paul Detwiler merely provided space for the routine so it could be implemented later.

— Eds.

Color Expo

The members of the Los Angeles Color Computer Users Group would like to thank you and your excellent staff for organizing the Color Expo in Los Angeles this month. We appreciate your willingness to involve local users groups every step of the way, and we are looking forward to hosting you and Color Computer users from all over the world in sunny Southern California this month.

Mark Randall President L.A.C.C.U.G.

ColorForth Fix

I want to correct some errors in the ColorForth review. (July, 1983) Although the program is distributed on tape, typing CLOADM EXEC causes the program to construct a bootable disk. The addresses you mention are for use when there is no disk system. Both versions of ColorForth work with disk and tape. It is also possible to save programs in compiled form by defining a couple of simple words. The ROM can easily be used by plugging it into a game cartridge, and if you have an appropriate expansion box, then the disk can also be run. It is worth noting that the bootable disk constructed from the tape puts Forth kernal in track 0, leaving all screens from 17 up free to the user.

Hoyt Stearns Electronics 4131 E. Cannon Drive Phoenix, AZ 85028

ROMpak Woes

I have just purchased a Color Scripsit ROMpak. I would like to warn your other readers about a problem I discovered with this program, so they too will not have this happen: If for any reason the program should hang up (a maddening experience) do not press reset, or any text will be lost!

Hugh Craig Sharon, MA

Piracy: Not So Bad

On page 15 of the August issue Jyym Pearson tells us the Color Computer "is not just going but hot." His whole article brightened my day. But then we get to page 96, End of File. Doom, death, destruction! We might as well sell our Color Computers because of pirates. But consider this: I read somewhere recently that there are about 400,000 Color Computers out there now, and about half a dozen

magazines devoted entirely to the Color Computer. If piracy was as bad as you say, would it have come so far? I doubt it.

Strikes me that if it weren't a profitable business, people wouldn't stay in it. And from what I read by people like Jyym Pearson, there will be no shortage of business for the Color Computer any time soon.

Don Ward Groton, CT Software piracy alone will not spell the doom, death, and destruction of the Color Computer. Piracy drives prices up. Piracy provides justification to manufacturers of uncopiable software. Nothing is more frustrating than having a disk crash, or tape break or stretch, in a program for which you have no back-up. Piracy costs the honest user money and aggrevation.

- Eds.

-Fix

Color Computing for Kids Fix

Kids! Don't panic! As careful as we were, a few errors got past our art department in the September column. On page 39 of the September issue, in the middle of the page, find the lines that read:

PRINT* 4-2 and PRINT $2 + 2 + 2^* - 4$

The asterisks (*) shouldn't be there — the lines should look like this:

PRINT 4-2 and PRINT 2+2+2-4

Take a pen and write this correction in that page, so you and the big people who read that article don't get confused in the future!

DYE-IT Corrections

Corrections for the disk version:

Line 10: change -429 at end of line to -432

Line 20: change x + 428 to x + 431

add line 250 DATA 0, 0, 0

or:

Load old DYE SETTER from disk. Change Line 20 to DEFUSR' = X:X = USR(0), save corrected DYE SETTER over old one.

Before typing any programs using DYE commands, be sure to run DYE SETTER first. Otherwise, the computer will not recognize DYE as a Basic word.

QUALITY SOFTWARE AND PERIPHERALS FOR YOUR COMPUTER

MYSTIC MANSION — New!! You'll be hearing lots about this incredible ALL GRAPHIC adventure. Explore the mansion and escape from the island, if you can! This one is tough to solve, but you'll have fun trying. For 32K Disk only. Disk \$29.95

SUPER STATS — New!! The most powerful statistics program available for the CoCo/TDP. Multiple linear regression, forecasting, mean, standard deviation, correlation coefficients, covariance, F and t tests. Powerful data editing and manipulation abilities such as transformation of variables including log, exponentiation, raise to a power and multiply by or add a constant. Data plotting, Student t tail areas, Gaussian cumulative probability distributions, and more. Flexible I/O (screen or printer, tape or disk). Very good documentation. 16K Extended BASIC. Cassette \$29.95

SIMPLEX — New!! Linear programming by the "simplex" method now available for the Color Computer. This powerful decision making tool finds the optimum "mix" for a given set of constraints. Ideal for business students, teachers, and professionals. Dynamic model dimensioning, with maximum size approximately 45 constraints and 45 variables. Disk compatible. 16 page manual included. 16K Extended BASIC. Cassette \$29.95

PAGE PLUS — Attention BASIC programmers! Here is the software you've been waiting for! Up to 56K available from your BASIC programs. This utility, written by Chris Hawks, does the memory management necessary to utilize the two 32K banks of memory. Easy enough for any "intermediate" level BASIC programmer to use. Includes documentation and demo programs to show you how to use PAGE PLUS to get the most out of your computer. Works with 64K tape or disk systems. Cassette \$27.95 Disk \$29.95

MDISK — Hal Snyder's latest breakthrough for the 64K Color Computer! MDISK lets you use the upper 32K of memory for rapid storage and retrieval of programs and data. Whether you own an actual disk drive or not, MDISK puts the "hidden" 32K to work for you as a "virtual disk," with capability to save and load up to 15 programs, view a directory of files stored in "page 1," kill unwanted page 1 files, execute BASIC or machine language directly from MDISK, chain to a BASIC program while preserving data already created, and more. These functions are available not only under manual keyboard control, but from programs in progress as well, permitting high-speed swapping of programs or data. Unlike many 64K utilities, MDISK doesn't copy BASIC to RAM. This greatly increases the amount of workspace available to you (by 22K in a disk system). MDISK is written in position independent code, and will work on disk or tape based 64K systems. Full documentation included. Cassette \$27.95 Disk \$29.95

ROMBACK — Why pay more? The easiest to use ROM-pak dumping utility available! At the best price, too! Comes with full documentation, including detailed patching instructions to allow several popular "problem" cartridges to run from tape or disk. Stop plugging and unplugging your disk controller! Don't blow any more SAM chips or 6809Es! Use ROMBACK, and run those programs from tape or disk instead. Works with any 64K Extended BASIC system. **Cassette \$16.95**

QUICKSORT — A machine language sort routine specifically designed to be used by BASIC programmers. Speeds up those programs where a BASIC sort is just too slow. Great for mailing lists and databases. Can be incorporated into many existing programs as well. Written in position independent code, works on tape or disk systems. 16K required. **Cassette \$12.95**

64K BOOT/PAGER — The 64K Boot allows you to modify BASIC by moving it from ROM to RAM. The PAGER is a menu-driven utility allowing you to manually page between the 32K banks of memory, copying BASIC or data from one page to the other. The complete assembler source code for both programs is included. Both are written in position independent code and run on 64K tape or disk systems. **Cassette \$19.95**

STRUCTURED MACROS — An assembly language programming tool for users of the Macro-80C assembler, by the Micro Works. Structured macros come close to transforming your assembler into a high-level language. Your programs become more understandable and debugging is simplified. Commands include IF, ELS, ENDIF, IFTST, IFCC, WHILE, ENDWH, REPEAT, and UNTIL. **Disk \$19.95**

WIZARD 64 — If you've got 64K, then this one's for you! Uses both 32K pages of memory for graphics and action—combines the features of Wizard's Tomb and Wizard's Tomb Part II into one great game. Challenging enough for adults, yet entertaining for younger players too. 64K Extended BASIC required. **Cassette \$21.95 Disk \$23.95 16K version \$12.95 32K version \$15.95**

All Software Available on 3" AMDISK Cartridges—\$4 additional

ORDERING INFORMATION
*\$10 shipping, handling, & insurance on printers,
Amdisk, and monitors. \$5 on modems. \$2 on all other orders.
All prices U.S. funds.

Skyline Marketing Corp. 4510 W. Irving Park Rd. Chicago, IL 60641 (312) 286-0762

QUALITY SOFTWARE AND PERIPHERALS FOR YOUR COMPUTER

AN ASTRONOMICAL ARRAY OF FEATURES FOR A DOWN-TO-EARTH PRICE

MORE QUALITY: 120 cps • thruput time of 58 lpm • high resolution (120x144) bit image & block (6x6) graphics • extra fast forms feed MORE FLEXIBILITY: super/sub script • underlining • backspacing • double strike mode • emphasized print mode • 816 character buffer • compatible with most software supporting leading printers • 10" carriage • 15" carriage Gemini-15 available

MORE RELIABILITY: 180 day warranty (90 days for head & ribbon)
mtbf rate of more than 5 million lines
print head life of more than 100 million characters

SAVE \$90.00!!!

Our incredible Gemini-10 package—a **PRINTING SYSTEM** ready to plug in to your Color Computer. **NOTHING MORE TO BUY.** Includes serial to parallel converter, graphic screen print software, deluxe user manual, and 5 minute setup instructions! A \$479.00 value. Complete package

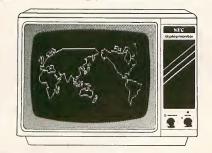
Wide carriage Gemini-15 also available:

Package ONLY \$579* Printer only \$499*



ONLY \$389*

Order yours today! Parallel printer only, \$309.



GET THE MOST FROM YOUR SYSTEM WITH AN NEC MONITOR PACKAGE!

Without a monitor, you'll never know just how good your graphics are. Word processing becomes less fatiguing, programming more enjoyable. NEC is famous for excellent color reproduction and tack-sharp resolution. We take the work out of adding the monitor to your system by including a custom plug-in monitor driver (with color, monochrome, and audio outputs), any required cables, and easy setup instructions. Buy with confidence—we've done the "homework" for you!

NEC 12" Color monitor (JC1212M) package ONLY \$389* NEC 12" Green-screen (JB1260M) package ONLY \$169*

NEC 12" Amber screen (JB1205MA) package ONLY \$219*

True lower-case and inverse video—just plug in the LCA-47. Special price with monitor purchase \$66.

GET SMART!! GREAT DEAL ON HAYES SMARTMODEMS

Hayes 300 baud Smartmodem—the amazing programmable auto-dial, auto-answer modem, now in a special package deal for your Color Computer. Buy the Hayes for list price, and at NO EXTRA CHARGE receive the Colorcom/E smart terminal program (cartridge or disk), an RS232 cable, and setup instructions! Act now!

Hayes 300 baud Smartmodem package ONLY \$289*

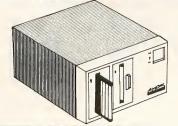
Hayes modem with CC cable only, \$249*

Signalman Mark I modem, 300 baud direct connect, list \$98, our price \$86*



The revolutionary 3" disk system! Two compatible 156K drives in a compact enclosure. Uses the rigid, protected 2-sided cartridge that has made others obsolete. Our package includes the Amdisk III, cable, disk controller, Disk BASIC manual, 12 cartridges, setup instructions, and a ML tape to disk program to help transfer your software! Everything you need, plus you save \$50!

Package price ONLY \$689* Amdisk III plus cable only \$479* Order Now!!



SALE ON AMDISK III DISK SYSTEM!!





UPS C.O.D. orders gladly accepted, \$2.00 additional.

SKYLINE 64K Memory Upgrade Kits

8 guaranteed 200 n.s. 64K memory chips, solderless installation instructions, Skyline's 64K BOOT and PAGER programs (a \$19.95 value). All for the super low price of \$59.00! Order yours today!

Super Sale on New Disk Drives

Starting at \$199.95 complete with Power Supply and Case!!

Tandon — Siemens — Remex — MPI — Teac — Shugart — Tabor All of Our Drives are Capable of Single AND Double Density Operation!

RADIO SHACK'— HEATH/ZENITH'— APPLE'/FRANKLIN' IBM/PC-TEXAS INSTRUMENTS'& MOST OTHER COMPUTERS

Drive a Hard Bargain!!™

5 M.B. - 12 M.B. with Power Supply Case, Cables & Software Complete Systems from \$999.95

Dual sided 40 TK or 80 TK drives with Power Supply and Case—Call Toll Free Diskette Breakthrough — 10 Pack in Library Case — \$18.95

TOLL FREE ORDERING GENERAL AND TECHNICAL

1-800-343-8841

1-617-872-9090

14100011/111/14 D114C010 1 = 0/3213112121212121117111171171717777777777	mg at + O. C
Color Computer Drive (1 2 3)	\$Call Toll Free
Apple/Franklin Compatible Add-On Drives with Case & Cables	\$219.95
Apple/Franklin Compatible Drives with Controller	\$259.95
Model I/III/IV Memory Upgrade	Call Toll-Free
Printers — Daisywheel/Dot Matrix	\$Call Toll Free
Diskettes in Library Cases	\$18.95
Cases and Power Supplies — (Single-Dual-1/2 Height)star	ting at \$49.95
Printer Buffers 8K to 512Ksta	rting at \$143.95
Percom Double Density Controller (Model I)	\$Call Toll Free
Holmes Model I/III Speed-up Mod-VID/80si	arting at \$90.00
Gold Fingered Edge Card Extenderssi	earting at \$13.00
Cables - Printer/Disk Drives	tarting at \$25.00
DOSPLUS\$\$	pecial Prices
D 10 1 1 0% 1 5 1T D 1	AA-119-11 P

Warranty on Disk Drives — 6 Months — Extended Warranty \$ Call Toll Free

One Edgell Road, Framingham, MA 01701

(617) 872-9090

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.)

Sat. 10:00 am to 4:30 pm

TERMS: M.C./Visa/Amex and personal checks accepted at no extra charge. C.O.D. please add \$3.00.

Not responsible for typographical errors

Shipping: Please call for amount.

751, CARRE VICTORIA, SUITE 405 MONTREAL, QUEBEC, CANADA, H2Y 2J3 Regular Tel. (514) 845-1534 Canadian Toll Free 800-361-5155

Canada

MICRO R.G.S. INC

Dealer inquiries invited.

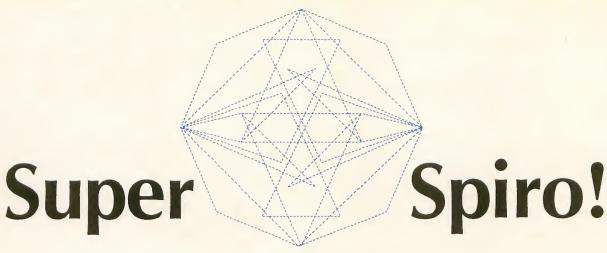
DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DR

ZENITH DATA SYSTEMS *FRANKLIN COMPUTER. INC. U

"IBM CORPORATION
"TEXAS INSTRUMENTS

Copyright 1983

DISK DHINES DISK DHINES DISK DHINES DISK DHINES DISK DHINES DISK DHINESDISK DHINES DISK DHINES



If you thought Spirographics was heaven, think again!

Figure 11.

'VE BEEN TOLD BEFORE (and by more than one person) that I'm a maniac. To be a bit more precise, I should qualify that by noting that I'm really quite harmless. In fact, my condition is supposedly curable — although I can't imagine why anyone on earth would want to be cured of spiro mania. Get the picture? If you haven't heard of such a conditon, stick with this article — you soon will. Not only that, but with any luck you'll catch the bug too.

I should first explain that the examples here were developed on the Tandy CGP-115 color graphics printer. If you haven't got one of these yet, get one now! You don't know what you're missing. It's unbelievable that for \$199.95 you get a four-color printer/plotter capable of text as well as graphics. All the graphics displayed in this article were drawn on such a plotter. I must warn you though, drawing mile after mile of convoluted, twisted wheels and whorls is the quickest way I know of drying up pens.

OK, color spirographers! Here are some new techniques which have been developed especially for this issue of The Color Computer Magazine. These techniques will bring you eye-bedazzling new effects which would be physically impossible in the real world of plastic cogs and wheels. That's part of what drew me into it; this is a small example of taking reality, feeding it into a computer, and making it go beyond reality. Oooh, heavy stuff! It all came about because of my fascination with the Spirograph (trademark) set which I have at home. I wanted to work out some of the math involved in drawing those intricate patterns, and see if it was feasible to write an algorithm to draw such wonders

by Jake Commander

on the computer. Not only did I manage to achieve that, but I managed some painless extrapolation (some what?) and invented the super-spirograph. Once you understand the technique, you'll be able to invent the hyper-spirograph all on your own. Rather you than me when it comes to putting that into practice!

Math - Groan!

Right! You're just dying to learn the math—I can tell. Well, don't let your eyes glaze over; it's honestly quite simple, involving just a weensy bit of trigonometry, and we all have to earn our BS degree somehow. Follow the diagrams and we'll walk through each dimension in turn.

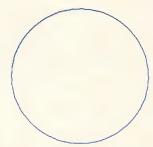


Figure 1. Radius 0=120, Radius 1=0, Radius 2=0; Ratio 1=4, Ratio 2=10; Start Number sides = 100, End Number sides = 0; Color sequence 1 1 1 1, Line type 0.

The first thing to understand is the plain old circle (Figure 1). Without this,

we aren't going anywhere. Don't imagine the circle as a continuous line twisting around 360 degrees, but see it as lots of dots which are so small as to appear continuous. The position of each dot in the circle can be calculated as two coordinates — one to ascertain its left/right (X-axis) position and one to determine its up/down (Y-axis) position. Dead easy!

The X-axis location is calculated by multiplying the radius of the circle (your choice) by the sine of the angle where the dot is located. The Y-axis follows the same pattern, but we use the cosine instead of the sine. This gives us two numbers. If we draw a dot at the intersection of the calculated coordinates we get:

Adot...

Not to worry though. A single dot is only the start. If the angle is changed by a small amount (say six degrees) and we plot again we now get:

Another dot.

Still not to worry — after we do this 60 times, we'll have gone through 360 degrees (that's 60 times six degrees). Now we have something resembling a circle. I told you it was easy. Not only was it easy but the computer's the poor sucker that has to do all this while we sit comfortably and watch.

There's one thing to note at this point and file away for a few moments. When each dot is drawn to build up a circle, we can leave them as dots (we might be able to see gaps), or we can join them up with lines. In our example, we'd end up with 60 lines making up a 60-sided polygon masquerading quite successfully as a circle. Ruminate on that for a while.

♠ more

You may think there's a lot of difference between a circle and a spirograph, and you're darned right! But there's not as much difference as you'd think. Here comes the step to understanding these beauties.

Imagine, instead of drawing dots at each coordinate, we draw circles. Now you'd get a circular pattern of circles. Aha, caught you out: you won't get a circleful of circles because we're drawing our new circles from dots too. So each dot now drawn is part of a small circle going around the circumference of a central circle. If the dots are drawn close enough together we'll retain a semblance of continuity. So, in fact we don't actually plot a whole circle at each point on the inner circle — we simply plot one dot of the outside circle. If we then move very slowly around the perimeter of the inside circle, the outside circles get stretched out like a long continuous spring. Viola! A spirograph (Figure 2)! Notice how this is larger than the circle, because the outer circle spins inside and outside of the inner circle.

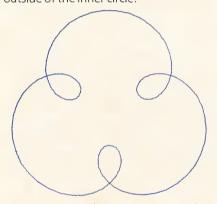


Figure 2. Radius 0=120, Radius 1=60, Radius 2=0; Ratio 1=4, Ratio 2=10; Start Number sides =100, End Number sides =0, Color sequence 1111, Line type 0.

Ugh! Trig!

The trigonometry for this is easy as well; we just go one single step past the example for the circle. First, as already described, we get the X/Y position of the dot that would be plotted if a circle was being drawn. This position is not plotted, but is used as the center of the next circle. The angle of the dot actually being plotted on the outside circle is worked out relative to this position.

Notice that two angles now have to be taken into account. One is the angle of the dot on the perimeter of the inside circle (this becomes the center of the outside circle), and the second is the angle of the dot on the outside circle. To get a graphic idea, conjure up an image of a

clock's hand with another clock's hand whirling round at the end of it. This is where the super and hyper (ad infinitum) spirograph comes in; every clock hand you imagine can have another hand spinning at its end. It's enough to drive a person to microcomputing.

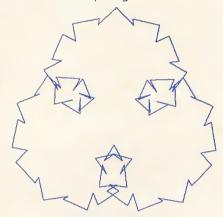


Figure 3. Radius 0=120, Radius 1=60, Radius 2=15; Ratio 1=4, Ratio 2=10; Start Number sides =100, End Number sides =0; Color sequence 1111, Line type 0.

The general method is the same. You just work out the position of the end of each "clock-hand" (which becomes the center of the next) until you come to the last. This is where the dot is actually plotted. For the sake of everybody's sanity my own included — I've gone no further than three clock-hands. The more you use, the harder it becomes to produce discernible patterns. Figure 3 is an example of a super-spirograph following our progression so far. This looks a little weird. Read on and you'll see why. Figure 4 is how it should look and Figure 5 is an example of decreasing the inner circle's radius with such a super-spirograph.

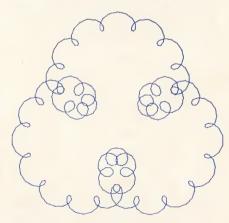


Figure 4. Radius 0 = 120, Radius 1=60, Radius 2=15; Ratio 1=4, Ratio 2=10; Start Number sides =400, End Number sides =0; Color sequence 1111; Line type 0.

As far as normal spirographs go, to alter their characteristics, you can change two things: the ratio of the radii of the circles involved and the relative rotational speed of the outside circles. This gives an immediate cursory control over the type of spirograph produced. For instance, the faster the outside circle goes (the higher its turning ratio), the more lobes are produced. Also, the larger the outside circle's radius, the deeper those lobes are. If you think about it, you'll see that if the outside circle's radius is smaller than the inside circle's radius, the lobes won't meet at the center of the inside circle. (The outside clock-hand is unable to reach the inner extremity of the hand driving it.) This gives patterns with holes in the middle, whereas longer outside radii overlap in the center giving Tudor Rose effects.

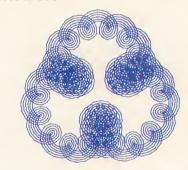


Figure 5. No details - custom produced!

Lines

Back to the lines; I bet you forgot. In using the CGP-115 plotter, these spirographs are drawn using lines to join up the dots. This is where a nifty technique comes in which produces some extraordinary results. It also explains why Figure 3 needed more resolution to become Figure 4.

Imagine if you drew a circle using the dot technique, but only plotted a dot every 90 degrees. You'd end up with four dots around the circumference and a very unconvincing circle. If you joined these dots together you'd end up with an even less convincing circle — it's called a square! If you used three dots you'd have a triangle, five would give you a pentagon, and so on. All in the cause of drawing a circle.

However, as the number of lines increases, the accuracy of the drawn figure improves. This is great with spirographs and I've produced my magnum opus using this technique (Figure 6). This is a 14-lobed super-spirograph drawn at first with low and then increasingly higher resolution, until at the end, the lines are

to page 18

ColorMate

The Color Computer's better half, ni COLORIGIE FEBRURES Variable basins to No. 2 2 2000 EAK RAIT Hinchester Disk cotion 24 by 42 usper/lower case display Fúll ASCII plus Control chars on keyboard Keyboard TypeRhead SDOS disk operating system Software TimeOfDay Clock SD BASIC Compiler Utilities Text Editor 6809 Assembler Honitor NO HARDIARE HODIFICATIONS!

COLORMATE unleashes the power of the Color Computer! It expands any standard CoCo with 16K and floppy disk to allow operation of SDOS, a fast, time proven operating system, and powerful program development tools like the BASIC Compiler. SDOS handles floppies and optional Winchester disk transparently. BASIC provides very fast code, long names, true subroutines and powerful disk file I/O.

Screen above is unretouched photograph of ColorMate display. Disk Extended BASIC is not required.

COLORMATE is \$495.00. Includes 400+ pages of documentation. Radio Shack floppy controller and floppy disk drive not included. Word processing, accounting, and Winchester disk drives are available. Write or call for details. Dealer inquiries invited.



COMPUTER SYSTEMS DISTRIBUTORS

P.O. Box 9769 Anaheim, California 92802 (714) 772-1390

See us at ColorExpo'83 Booth #211

Circle No. 10 on Reader Service Card

small enough to fool the eye into seeing curves. By this time, an incredible series of interconnecting lines produces some spectacular effects which more than make up for the lack of color.

The program accompanying this article lets you experiment with the lengths of the three radii, ratio of rotation of the two outer circles, and number of lines making up the spiral to start and to end

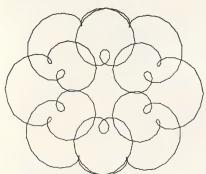


Figure 6. Super Spiro 1:Radius 0=100, Radius 1=50, Radius 2=25; Ratio 1=7, Ratio 2=3; Start Number sides = 250; End Number sides = 0; Color sequence 0 0 0 0; Line type 0.

with. I've also allowed for a sequence of up to four colors to enable multicolored graphics. This can be increased to a longer color sequence if desired. Be careful with color; unlike pixels on a TV screen, ink mixes color subtractively, meaning that more color means darker color. Finally, the type of line used for drawing can be specified — the CGP-115 allows types of lines from continuous to coarse dashes — which allows an extra dimension with which to experiment. Don't use all these options at once, though. You'll only waste ink and produce something more akin to a punkograph. I know this for a fact — the research for this article resulted in most of a print roll ending up "on the cuttingroom floor" and a set of pens permanently retired. But, oh, what fun!

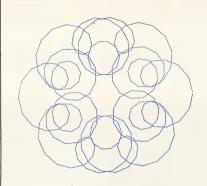


Figure 7. Super Spiro 2:Radius 0=120, Radius 1=40, Radius 2=50; Ratio 1=7, Ratio 2=3; Start Number sides = 230; End Number sides = 0; Color sequence 0 0 0 0; Line type 0.

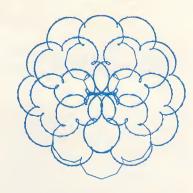


Figure 8. Super Spiro 3:Radius 0=100, Radius 1=85, Radius 2=20; Ratio 1=8, Ratio 2=6; Start Number sides = 270; End Number sides = 280; Color sequence 1 1 1 1; Line type 0.



Figure 9. Magnum Opus: Radius 0=180, Radius 1=60, Radius 2=5; Ratio 1=15, Ratio 2=10; Start Number sides = 4; End Number sides =128; Color sequence 0 0 0; Line type 0.

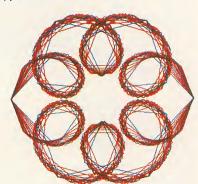


Figure 10. Radius 0=100, Radius 1=60, Radius 2=0; Ratio 1=7, Ratio 2=0; Start Number sides = 24; End Number sides =54; Color sequence 1333; Line type 0.

Figure 11. Radius 0=90, Radius 1=120, Radius 2=0; Ratio 1=17, Ratio 2=0; Start Number sides =4; End Number sides =12; Color sequence 3333; Line type 3.

Program Listing. Super Spiros

10 PI=3.142:INPUT"R0";R0:INPUT"R
1";R1:INPUT"R2";R2:INPUT"G1";G1:
INPUT"G2";G2:INPUT"Start # sides
";SS:INPUT"End # sides";ES:INPUT
"Color sequence";C(0),C(1),C(2),
C(3):INPUT"Line type";L
20 PRINT#-2,CHR\$(18);"S0":FORNS=
SS TO ES STEP2:ST=PI*2/NS
30 PRINT#-2,"L";STR(L):PRINT#-2,
"C";STR\$(C(C)):PC\$="M"
40 FORAO=0TO6.29STEPST
50 GOSUB120:PRINT#-2,PC\$;STR\$(24
0+XP+X0);",";STR\$(YP+YO)
70 PC\$="D"
80 NEXTAO:C=C+1AND3:NEXTNS:PY=2*
(R0+R1+R3)+8:PRINT#-2,"M0,-";STR

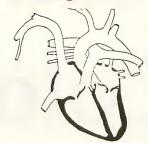
\$(PY)
90 PRINT#-2,"PRAdius 0="R0"Radiu
s l="R1"Radius 2="R2"Ratio l="G1
"Ratio 2="G2:PRINT#-2,"M0,-"str\$
(PY+10):PRINT#-2,"PStart # sides
="SS"End # sides ="ES"Color sequ
ence"C(0);C(1);C(2);C(3)"Line ty
pe"L:END
100 XP=SIN(A0)*R0:YP=COS(A0)*R0:
RETURN
110 GOSUB100:XP=XP+SIN(A0*G1)*R1
:YP=YP+COS(A0*G1)*R1:RETURN
120 GOSUB110:XP=XP+SIN(A0*G1*G2)
*R2:YP=YP+COS(A0*G1*G2)*R2:RETURN
N

PETROCCI FREELANCE ASSOCIATES



Inspector CLUEseau

Sherlock Holmes/Agatha Christie fans-It's finally here-A murder mystery game for the 80-C! Mr. Goodbody has been killed in his mansion and you must solve the mystery. WHO committed the murder, WHERE did it occur and HOW was it done! Question suspects, find the secret passage, and break the code to get clues. Hi-Res graphics enhances this excellent game. The computer records the clues you obtain on a clue inventory screen and also provides suspect descriptions at the touch of a finger. A fast, fun game that will sharpen your deductive skills. Every game is different



Bowling Secretary

Save hours of tedious work with this efficient program. Calculates individual player average, high game and total pins, as well as team games won/lost, high series, and cumulative total team points. Also calculates team standings for each week in order from 1st to last! All data stores to tape and outputs to printer to provide professional, easy to read copy. After intitial input of league and player names all you have to do is input each week's scores - the computer does the rest!!!

16KEXT Cassette \$24.95 32KEXT Disk 29.95

Heart-Lung-Circulatory Systems Hi-Res Graphic Education

A difficult subject becomes easy to learn. Programmed learning approach divides subject content into concise frames of information. Hi-res graphic display with labelled anatomical structures follows text frames for added clarity. Visually highlights keywords and concepts. Self test questions follow each section. Provides immediate feedback to user response and displays correct answers before moving to new subject matter. Excellent for school or home use.

32KEXT Tape \$34.95 32KEXT Disk \$39.95

* PATTI-PAK *

2 Intermission Screens (Fireworks & Chase)

Extra Man Every 10,000 pts.

★ 16K Machine Language ★



Invisible Maze Every 4th Screen

Difficulty Level Auto-Increases As You Progress

> Just Like The Arcade And More!

> > * \$21.95 *

HURRICANE TRACKER

Plots up to three hurricanes simultaneously on hi-res map.

Excellent graphic display. 2nd program provides hard copy printout.

WEATHER WATCH

Calculates Nat'l Weather Service Statistics. Great for Science Projects and Hobbyists. Well formatted printout.

WEATHER FORECASTER

Special Price 32KEXT Disk \$19.95

* KIDS KORNER *

Big Bigger Biggest 16KEXT Tape \$9.95 ABC's 16KEXT Tape \$9.95 123's 16KEXT Tape \$9.95 All four for



* INVESTORS *

Real Estate Investment

(Residential Income Property)

Helps you answer "which one to buy?" when faced with real estate investment choices. Calculates after-tax return on investments for each alternative as well as the first year cash flow for each. Also tests outcomes for varying input situations (i.e., "what if .. occupancy rate changes, loan rates higher or lower, appreciation rates on property change). Printer Output Option. Well Documented, 16KEXT Tape \$24.95 32KEXT Disk \$29.95

BOND YIELD

Helps you find "best buy" in selecting bonds. You select several bonds for comparison and program calculates yield to maturity for each. You will see surprising variations and use of this program will spot "true bargains" in the bond market. Well Documented. Printer Output Option.

Include \$1.50 for handling for each program. Az. Residents add 6% Sales Tax. Quantity Discounts to Dealers.





PETROCCI FREELANCE ASSOCIATES 651 N. Houghton Rd. Tucson, AZ. 85748 602-296-1041

STRESS EVALUATOR

Measures your stress level and illness potential.

Coping Ability Test/Goal Setting Exercises Excellent Graphic Charts/Meditation Screen Printer output option

16KEXT Tape \$24.95 32KEXT Disk \$29.95

MEDICAL TERMINOLOGY

Most Common Suffixes and Prefixes. Abbreviations used in Hospital Charting. Choice of Study/Self Test/Definition Readout

STAGECOACH

Deliver Annabelle and the Gold to the Judge. But watch for Indians and the James Gang!! 16KEXT Tape \$19.95

ASTROLOGY CHART PRINT

Now for LPVII & EPSON MX80

Full Size Graphic Printout from user input of planetary positions and house cusps. Prints Comparison Charts around Natal Accommodates Placidian, Equal House, Modified Equal

Epson MX80 Version requires GRAFTRAX 32KEXT Tape \$21.95 32KEXT Disk





4K Color Basic

Color Computing for Kids

FOR/NEXT loops,
a Thanksgiving program,
and a typing lesson for P.T.s!

ELLO P.T.S.!
That stands for "Programmer Trainees," and going into our third lesson the title is official. You've been following all my directions (thaank you!), working very hard (oouch!), and having some fun (Goood!). You've discovered magic in your typing finger (oooch!) and by now you deserve a bag of Reese's Pieces, but I can't reach out to all of you, so for your reward — you guessed it — P.T., PHONE HOME!

Now, to keep earning that prestigious title...

The FOR/NEXT Loop

This month we're going to work with one of the most useful statements in computer programming — the FOR/NEXT loop. It is used in nearly every program to repeat a programming step a specific number of times. This saves the programmer a lot of time because it makes a program shorter — the statements need only be entered one time, and the computer will read and process them as many times as the FOR/NEXT loop specifies. This statement saves memory space, also, and when programs are lengthy that can be a very important saving.

Since the FOR/NEXT loop has an incredible number of uses, and because it is so

by Jean Plesser

```
10 CLS
20 K=1 : S=0
30 IF K >= 10 THEN 100
40 PRINT*THE SUN OF THE FIRST*K
50 S=S + K
60 PRINT*BIGITS IS*S
70 PRINT
80 K=K+1
90 60 TU 30
100 END
OK
```

Photo 1. A. A program screen without FOR/NEXT loops.

```
10 CLS
20 S=0
30 FOR K = 1 TO 10
40 PRINT*THE SUN OF THE FIRST*K
50 S=S + K
60 PRINT*DIĞOTS IS*S
70 PRINT
80 NEXT K
100 END
GK
```

Photo 1. B. The same screen with FOR/NEXT loops.

important, I spent a lot of time thinking about how I could present it so you would understand it clearly. I would get an idea, think it through, sigh, shake my head, then search for another idea. This went on for several hours until maybe five ideas later, I GOT IT!!

My idea process can be illustrated in a FOR/NEXT loop to show you how this statement works. If we let the letter "I" represent the number of ideas I had, the loop would look like this:

```
10 FOR I = 1 TO 5
20 PRINT "IDEA #" I
30 NEXT I
40 PRINT "I GOT IT!!"
```

Before you enter this program and run it, carefully read the following explanation for each line:

Line 10 — the word FOR tells the computer that a loop is beginning. Any letter can be used in place of I — the letter is used to store a number each time the computer goes through the loop — I = 1, then I = 2, then I = 3, and so on, until the loop is complete. In this program I will equal one to five.

Line 20 here — the computer will print IDEA#, followed by the value of 1 each time it passes through the loop.

Line 30 — the word NEXT tells the computer to change the value of I. In this case it adds one, then it goes back to the FOR statement until the loop is complete.

```
DK
LIST
10 FOR L = 1 TO 10
20 PRINT L;
30 NEXT L
DK
RUN
1 -2 3 4 5 6 7 8 9 10
DK
```

Photo 2. Printing the numbers 1 to 10.

Line 40 — prints (GOT)T!!

Now that you're beginning to get the idea — off to your computer, turn it on, and type the program exactly as you see it. If you need to, now would be a good time to review the NEW, LIST and RUN commands from last month's article. Also, don't forget to use the CLEAR key whenever you start typing anything new on the screen.

After you RUN the program, check the listing until you clearly see where and when the values of I changed. All FOR/ NEXT loops work in the same way, but you can do many different things with them, so as soon as you're ready for another example, type NEW.

When you run the following program it will print the numbers from one to ten, but because a semicolon (;) follows the PRINT statement, the numbers will be printed on the same line — try it:

```
10 FOR L = 1 TO 10
20 PRINT L;
30 NEXT L
```

This program will loop from FOR to NEXT ten times, printing the value of L each time. After you see it run, change Line 20 to each of these examples (RUN the program after each change):

20 PRINT "HAPPY THANKSGIVING"

then,

20 PRINT "HAPPY THANKSGIVING ";

For each change the computer still made ten loops, but we didn't use the

```
20 PRINT S
30 NEXT S
GK
RUN
10
9
8
7
6
5
1
3
2
1
```

```
20 PRINT THAPPS THANKSGIVING*
30 NEXT L

OK
RUN
HAPPY THANKSGIVING
OK
```

Photo 3. A. Printing "Happy Thanksgiving" without a semicolon.

values of $\[L]$ in our PRINT statements this time — $\[L]$ was used only for counting. Change Line 20 once again to print your name, and change the value of 10 to other numbers.

The STEP Command

If we add a STEP command to the FOR statement, we can control the way the FOR/NEXT loop counts. Here's an example of a loop that counts backwards:

```
10 FOR S = 10 TO 1 STEP -1
20 PRINT S
30 NEXT S
```

Line 10 — tells the computer that s will start at ten and end at 1. The STEP command of -1 tells the computer to subtract 1 each time it passes through the loop. RUN the program to see how s gets smaller.

Now, change Line 10 to each of the following examples, and RUN the program after each change to see the difference, then try the next example when you understand how the STEP command controlled the counting values:

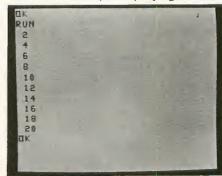
```
10 FOR S = 2 TO 20 STEP 2

10 FOR S = 20 TO 2 STEP -2

10 FOR S = 5 TO 50 STEP 5

10 FOR S = 100 TO -10 STEP -10
```

As you can see, the values (numbers) of a loop can start and stop at any number and the STEP value can increase or decrease the loop. Keep trying numbers



```
OK
LIST

10 FOR L = 1 TO 10
20 PRINT "HAPPY THANKSGIVING";
30 NEXT L

OK
RUN
HAPPY THANKSGIVINGHAPPY THANKSGI
VINGHAPPY THANKSGIVINGHAPPY THANKSGIVINGHAPPY
THANKSGIVINGHAPPY THANKSGIVINGHAPPY
THANKSGIVINGHAPPY THANKSGIVINGHA
PPY THANKSGIVINGHAPPY THANKSGIVINGHA
PPY THANKSGIVINGHAPPY THANKSGIVINGHA
PPY THANKSGIVINGHAPPY THANKSGIVINGHA
PPY THANKSGIVINGHAPPY THANKSGIVING
```

Photo 3. B. Printing "Happy Thanks-giving" with a semicolon.

of your own in Line 10, and also make these changes in Line 20:

```
20 PRINT S;
20 PRINT S,
20 PRINT "S =" S
```

Arithmetic Symbols

As you've already seen, the FOR/NEXT loop always counts the number of times it goes through the loop, but it can do much more than just print out that number. The computer can also do addition, subtraction, multiplication, and division, using the value number of the loop. Before we try this you need to know the right symbols to use. BASIC, the language your computer understands, uses these arithmetic symbols: + =Addition; - =Subtraction; $\times =$ Multiplication; and / =Division.

Type NEW to erase memory, then try these examples, pressing the ENTER key after each one. In this way you're using the computer as a calculator and the answer will always appear on the next line:

```
PRINT 4 + 2
PRINT 4 - 2
PRINT 4 * 2
PRINT 4 / 2
```

There is more to be known about computer math, but that will come in a future lesson. In the meantime, keep your arithmetic problems simple and try numbers of your own using these symbols. When



Photo 4. A, B and C — Three versions of the STEP command.

you're ready, type the following program, which uses all the symbols and the value of the loop for each problem:

10 FOR L = 4 TO 8 STEP 2 20 PRINT L "+ 2 =" L+2 30 PRINT L "- 2 =" L-2 40 PRINT L "X 2 =" L*2 50 PRINT L "/ 2 =" L/2 60 NEXT L

Line 10 — tells the computer to make Lequal to the number 4, then 6, then 8, because it counts by the STEP command of two

Line 20 through Line 50 — tell the computer to print the value of L, then print what's inside the quotation marks (""). It then gives the computer the problem (equation) to calculate, and the answer is printed after the equal (=) sign.

Line 60 — adds to the values of L and sends the computer back to Line 10; or, the loop ends if all L's are complete.

Again, try other values for L and for the STEP command until you feel comfortable in your understanding of what is happening each time the computer makes a loop.

NOTE (that means "pay special attention to this"): Because the screen contains only sixteen lines, we can easily run out of screen space when using FOR/NEXT loops. If this happens to you and lines begin scrolling up the screen faster than you can read them, just press the SHIFT key and the @ key at the same time. The printing will stop for as long as you want. To start the printing again, press *any* key. You can do this as often as you want, until the end of your program.

Nested Loops

FOR/NEXT loops can be placed inside other FOR/NEXT loops, making nested loops. Here's an example using two loops together:

10 FOR A = 1 TO 3 20 FOR B = 1 TO 3 30 PRINT "A =" A, "B =" B 40 NEXT B 50 NEXT A

Pay special attention to the order of the NEXT statements. The innermost loop *must* end before the outermost loop. If you put the NEXT statements in the wrong order you'll get an error message from your computer. In this example the computer will give A the value of one, then it will go through the B loop three times while A still equals one. Then A will equal two and the B loop will be executed again; then A will equal three, and so on. When you run this program, carefully read the values of A and B — A will change one time for every three



Photo 5. Press the SHIFT and @ keys at the same time to stop the video screen scrolling.

values of B — take some extra time here if you need to.

Nested loops require time and practice to be used properly, but here's a program that should help you understand them a little better:

10 REM -A MULTIPLICATION TABLE

20 CLS

30 FOR M = 1 TO 12

40 FOR N = 1 TO 12

50 PRINT M "X" N "=" M*N

60 NEXT N

70 FOR D = 1 TO 500 : NEXT D

80 PRINT : PRINT

90 NEXT M

Line 10 — is a remark statement (REM statement) giving the program a name.

Line 20 — clears the screen before the program starts.

Line 30 — tells the computer to loop 12 times for M.

Line 40 — tells the computer to loop 12 times for N.

Line 50 — prints and calculates each problem using the values of M and N.

Line 60 — sends the computer back to Line 40 for the next value of N and when 12 values are complete the computer will go on to the next line in the program.

Line 70 — this FOR/NEXT loop creates a pause, or delay, in the program. The computer counts to 500, giving you time to press the SHIFT key and the @ key to stop the printing long enough to read the lines on the screen.

Line 80 — prints two blank lines to separate each set of multiplication tables.

Line 90 — sends the computer back to Line 30 for the next value of M, then through the N loop until all values of M are complete, at which time the program will end.

When you RUN the program, study it carefully so you can determine where the values of M and N change, and don't forget to press the SHIFT and @ keys when you reach a pause.

If you have a printer, delete (erase) Line 70 — just type the number 70 and press ENTER — then add these lines to your program:

55 PRINT #-2, M; "X"; "N"; "="; M*N and

85 PRINT #-2: PRINT #-2

Make sure your printer is turned on before you run the program, and in the future you can replace any PRINT statement with PRINT #-2 whenever you want to use your printer. If you want a listing of your program on the printer, just type LLIST and press the ENTER key.

FOR/NEXT Color

This loop will color your screen with all nine colors:

10 FOR C = 0 TO 8

20 CLS(C)

30 FOR D = 1 TO 500 : NEXT D

40 NEXT C

Line 20 — uses the value of c to determine the color in the CLS() statement.

I think that by now you're gaining an understanding of how FOR/NEXT loops work and how valuable they can be to a programmer — even to a Programmer Trainee. They have many different uses, and I'll give you a few more examples as we go on to another command.

Let's Hear From You

Your computer has a voice and it's time we let it SOUND off! The command looks like this: SOUND x,y. In place of the x use any number from 1 to 255. This is the tone — 1 is the lowest tone and 255 is the highest. In place of the y you can again use any number from 1 to 255. This number tells the computer how long you want the tone to sound off. As close as I can figure it, 17 = one second; 50 = three seconds; 100 = six seconds; and

Let's try it. Turn up the volume on your TV and type: SOUND 1,17, then, SOUND 255,17.

Impressed? Well, try other numbers anyway, and if you want to hear all the sounds (this *will* impress you), use this program:

10 FOR S = 1 TO 255 20 PRINT "THIS IS TONE #" S

30 SOUND 5,1

30 300ND 3

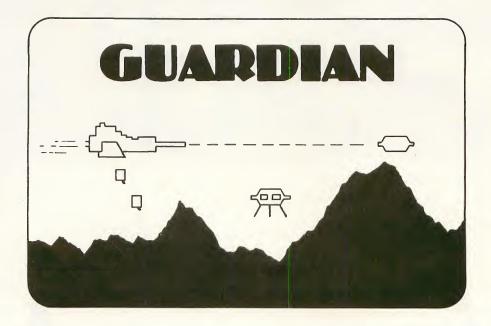
40 NEXT S
Want to hear them in rev

Want to hear them in reverse? Change Line 10 to:

10 FOR S = 255 TO 1 STEP -1

That's about all there is to the SOUND command, except that you can put sounds together to play a tune, but since

to page 26



IF YOU HAVEN'T PLAYED GUARDIAN, THEN YOU HAVEN'T PLAYED THE BEST.

Check these features:

- 1). The Landers aren't suddenly just "there", they implode out of particles!
- 2.) Not just "Beeps" but stunning sounds!
- 3.) Explosions just like the arcade with no skimping!
- 4.) Thrust flame behind your ship.

... and many more!

Order now by check, M.O., C.O.D., or see your dealer... (If he doesn't have it yet, send him to us!)

\$27.95 — Tape / \$29.95 — Disk

Add \$1.50 per order for postage and handling. California residents add 6%.



QUASAR ANIMATIONS 1520 Pacific Beach Drive San Diego, CA 92109 (619) 274-2202

New 64K TRS-80° Color Computer



Our Most Powerful TRS-80 Color Computer Ever!

More Color Computer Than Ever! Double your programming power with our low-cost, 64K Extended BASIC Color Computer! Features a new 53-key electric typewriter-style keyboard and comes in a compact, attractive white case. Access 32K of memory with Extended Color BASIC or add our new advanced programming tools to take advantage of the full 64K capacity!



Extended Color BASIC.

Easy to Expand. The Color Computer features a serial I/O interface, plus cassette, joystick and ROM (Program Pak) ports. As your needs grow you can expand with a printer, plotter, digitizer, graphics tablet, up to four disk drives, or a telephone interface.

(49,152 pixels). You also get multi-

character variable names (two signif-

icant), string arrays up to 255 characters, full-featured editing, trac-

ing, floating point 9-digit accuracy, trigonometric functions, user defin-

able keys, specific error messages and PEEK, POKE and USR com-

mands. You get easy-to-follow tuto-

rial manuals on Standard and

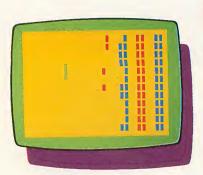
Do Sophisticated Programming. Advanced users can add a disk drive and our new OS-9 operating system to access the 64K memory and do assembly language programming. OS-9 includes functions for disk and terminal input/output, software memory management and multitasking. It contains approximately 40 utility programs used for system and disk file maintenance and control. System programs are written in assembly language, except for some utilities written in the C language. OS-9 features a text editor, assembler and debugger.

High-Resolution Color Graphics. You'll also appreciate the power of Extended Color BASIC by Microsoft*. Easy-to-use commands make it simple to create drawings, business charts, engineering diagrams, even animation! Choose from five color graphics formats, with resolution ranging from 64 × 32 (eight colors) to 256 × 192

An Incredible Accessory. The new Multi-Pak Interface (26-3024, \$179.95)—shown in small photo above—lets you connect up to four Program Paks to your Color Computer at once! When you're ready to change from one Program Pak to another, just move the Interface's selector switch, or change between slots under program control. Use it to connect peripherals to the computer, too.

See It Today. Visit your nearby Radio Shack Computer Center, participating store or dealer and ask for a "handson" demonstration.

and a Super Program Pak™ Sale!

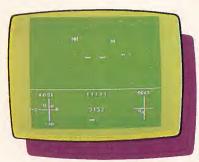


Save \$1207

Reg. 24.95

1288

Super Bustout*. Our lowest price ever for this exciting and enjoyable favorite! Break through not one but three brick walls! It's doubly challenging when you play with "gravity"! Several ways to play—alone or with up to three competitors, on the same or on separate courts, with the ball flying vertically or horizontally.

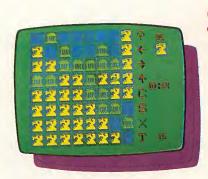


Save \$2007

Reg. 39.95

1988

Project Nebula*. Only you can save the Earth! Fiendish aliens are all around! Engage in thrilling "dog fights" as your starship travels through space. You must seek out and destroy the enemy vessels. But watch out! If you run out of power, the Earth is doomed! Four modes of skill, each with 10 levels of difficulty.



Save \$707

Reg. 29.95

2288

Roman Checkers. The classic game of strategic placement—as easy to learn as checkers, but as rewarding to play as chess! You play against the Color Computer at the skill level you've obtained. The computer doesn't hold a grudge, but generously offers advice. You can even take back moves if you like.



Save \$1507

Reg. 29.95

1488

Handyman. Are you embarking on a do-it-yourself home improvements program or a lawn project? Just feed in the measurements and Handyman will tell you how much lumber, paint, insulation, fertilizer, sand, gravel, etc. you'll need. Helps you compare prices, too! Let Handyman help save you money, time and effort!



Save \$707

Reg. 14.95

788

Audio Spectrum Analyzer. Test your stereo equipment for maximum performance. Color bar graphs show the power distribution over nine full octaves in ½ octave segments, from 31.5 to 12,500 Hz. Or just enjoy a kaleidoscope of dancing patterns that change with the music. Requires cassette cable (26-1207).

Hurry—Sale Ends Nov. 20, 1983 Circle No. 13 on Reader Service Card

Radio Shack

The biggest name in little computers®

A DIVISION OF TANDY CORPORATION

NEW 1984 TRS-80 COMPUTER CATALOG! Send for your free copy today.

Mail To: Radio Shack, Dept. 84-A-612 300 One Tandy Center, Fort Worth, Texas 76102

ADDRESS _______STATE ____ZIP _____

*Joysticks required. Prices apply at participating Radio Shack stores and dealers. Microsoft is a registered trademark of Microsoft Corp.



Figure 1. Keyboard and Finger Assignments

I have a "tin ear," I'll refer you to Radio Shack's *Getting Started With Color Basic*— the manual you received with your computer. There's a program on page 52 that uses a nested loop to play "Three Blind Mice."

All Together Now

I'm not a quitter, so I'll show you how to add sounds to a program just for fun. I've put together all you've learned in this lesson — the FOR/NEXT loop, plus SOUND, plus a few little Pilgrims and little Indians — and we get something along the lines of "Ten Little Indians." This program won't play it, but think of the tune as you watch it run.

Here's my Thanksgiving contribution: I hope you like it, but more than that, I hope it gives you ideas of your own (see Program Listing 1).

A Typing Guide

A computer programmer does a lot of typing; right — so does a P.T. You can get by using one or two fingers, and while two are faster than one, ten are fastest. Learning to type properly isn't hard, but it does take practice — just a little each day using the right fingers on

the right keys, and soon you'll be a whiz at the keyboard.

I can't really teach you to type, but I can guide you with the help of a Typing Chart. As you look at the chart, you'll see that lines are drawn through sections of the keyboard, and each section is numbered to match the numbers of each finger at the bottom of the chart. As you practice, do your best to reach for each key with the matching numbered finger. Some keys are too hard to reach, so just press them with any finger that's comfortable. Now, let's put some of this information to work.

Hold both hands over the keyboard (palms down). Put your number one finger on the A key; number two finger on the S key; number three finger on the D key, number four finger on the F key, and put your left thumb on the spacebar. Your right thumb goes on the spacebar also, then your number five finger goes on the J key, your number six finger on the K key, number seven finger on the key, and number eight finger on the semicolon key. This may feel strange and uncomfortable, but practice will change that in time, so don't give up yet.

These keys are called the "home" keys, and your fingers return to this position after typing anything. Your thumbs

control only the spacebar, but all your other fingers reach for their assigned keys. Begin practicing by typing each letter of the "home" keys one at a time. Start with the A key and go across the row to the semicolon key. Say the letter as you press it and continue doing this until you know the "home" keys without looking at them.

Once you've mastered the "home" keys, use the chart and practice with one finger at a time. Start with your number one finger, say each letter as you press it — Q A Z, Q A Z — and continue this way until you learn the entire keyboard. This will take many practice sessions, so give yourself time, but do try to practice nearly every day. One day you'll be typing programs like a pro!

Now you're a P.T. as well as a T.T., working toward a P.T.P: did I lose you? That's a Programmer Trainee, a Typist Trainee and a Programmer Typing Professionally!

Once again we've covered a lot of programming steps, and next month all our lessons will come together in a graphics lesson for the December holidays. In the meantime, have a happy and delicious Thanksgiving. But, remember: "BEEE GOOOD, P.T." — Practice!

Program on page 29



* * * MORE THAN JUST A DATABASE * * *

Turn your TRS-80 Color Computer into a powerful business machine. Create and manage customized records for innumerable home and office applications. HOMEBASETM data management system goes beyond just storing, sorting and retrieving your business records. It allows you to use the same data records in calculations and in printing form letters and reports. The HOMEBASETM text processing system is both a word processor and a complete filing system. Store 250 screens of text as data records and then use any portion of a record for searching, sorting, or for printing form letters and special reports.

HOMEBASETM is an invaluable tool for managing a business involving insurance sales, real estate sales, property rentals/management, mail-order sales, or any comparable business. Using HOMEBASETM, both accounting and non-accounting applications are easily automated to save you time and provide better information about your business. Create customized ledgers or extend your payable and receivable records to include descriptive data important to the daily operation of your business as well as its continuing success.

HOMEBASE™ is a menu driven system and does not require programming. The system documentation includes descriptions of every menu option and is uniquely designed for quick referencing. System documentation includes a tutorial and demonstration program.

\$35

DATA MANAGEMENT

• 50 data fields • Formatted dates, time of day; phone numbers, & dollar amounts · 24 scratchpad data fields not stored within any data record . Variable-length alpha/text data fields . Reorganize records using move or ascending/descending sort on any data field • Manage files using search/select, delete, clear, duplicate or list . Perform calculations on any numeric data using add, subtract, multiply, & divide . Print using automatic formatting with options to print report titles, page numbers, record names and data names . File Utilities include generate, merge, duplicate, summarize, cassette backup/reload, rename, delete, directory display/print and moving data between files.

\$15

CUSTOM REPORTING

• Merge data management files with text files • Create and store form letters and report formats • Print each data record as one letter or report • Print selected records as a single report/list • Change the print field size for any data field • Use a single report for different files • Print multiple copies.

HOMEBASE

SYSTEM REQUIREMENTS

TRS-80 Color Computer with 32K; Disk Basic; and one disk drive. 2 Disk drive option is included - NO EQUIPMENT MODIFICATIONS REQUIRED.

\$25

TEXT/WORD PROCESSING

• 250 screens of text • Reorganize text records using move, copy, or ascending/ descending sort • Manage text files using search/select, delete, clear, duplicate, move or list • Print text record appearing on the screen to review before final printing or print all of a selected group of records • Format using embeded printer controls for paging, skipping lines, and changing fonts • Program printer controls include right & left margins, lines per page, page width, horizontal tabs, page heading, page numbering, line spacing, and multiple copies • File Utilities include generate, merge, duplicate, synchronize, cassette backup/reload, delete, rename, and directory display/print.

TURN YOUR COLOR COMPUTER INTO A POWERFUL BUSINESS MACHINE TODAY. ORDER TOLL FREE 800-334-0854

Credit card holders call toll free: 800-334-0854, extension 887. In North Carolina call: 800-672-0101, extension 887 or send check or money order to:

HOMEBASETM is a trademark of HOMEBASETM COMPUTER SYSTEMS, a subsidiary of Small Business Systems, Durham, NC, (919) 544-5408. TRS-80 is a trademark of Tandy Corp.

HOMEBASETM COMPUTER SYSTEMS P.O. Box 3448, Durham, N.C. 27702

90 day warranty

NC residents add 4% for sales tax. Allow 1 to 3 weeks delivery.

BEWARE of products that do not work in all versions of the CoCo. We guarantee ours will.

BEWARE of products that do not work with all expansion units. We guarantee ours will.

BEWARE of products that do not work with disk systems. Many won't, but ours will because they are fully decoded. Remember, even if you don't own a disk now, you will someday and you don't want to be stuck.



BEWARE of products that are housed in cheap plastic. Ours are encased in a sturdy metal case to eliminate TV

BEWARE of manufacturers that do not offer software support. The library of music and speech synthesis programs shown below is only the beginning of our support.

BEWARE of manufacturers that try to cut corners. Our boards have gold plated fingers and important IC's are socketed

MUSICA

Speech Systems was the first to offer the CoCo community 4 voice music with the COMPOSER. We now offer you an incredible 4 voice music program that contains features typically only available on hardware music synthesizers costing 10 times the price.

- The notes are displayed on the screen in high resolution graphics.
- · Treble and bass staffs are shown individually.
- Notes are input using keyboard arrow keys or joysticks.
- You probably don't believe that. It's true, you can input notes using a joystick.
 Up or down movement positions the note on a staff, right or left motion makes it a flat or a sharp.
- · You can insert a few notes and listen to it immediately.
- You can stop and start the music at any point for editing or crucial analysis.
- You can develop an unlimited number of timbre definitions using a super-fast waveform synthesis option.
- · You probably don't believe that one either. But it's true.
- The tempo can be varied during compositions.
- Music may be saved and loaded and may even be called from your own BASIC program.
- The music may be directed to the TV speaker or the STEREO COMPOSER (see
- Special effects include chorus and 3-position stereo with three voices, and exchanging stereo channels during execution (see STEREO COMPOSER).
 MUSICA automatically adjusts to 16K, 32K, and 64K machines.
- MUSICA is a machine language program that performs all functions super fast.
- MUSICA is completely software, no need for additional hardware.
 We guarantee MUSICA is the best music program you can buy for the Color Computer.

'	
MUSICA (16K, 32K, 64K Cassette)	\$34.95
MUSICA (32K, 64K Disk)	

THE COMPOSER

The COMPOSER is a 4 voice music compiler with a 7 octave range. A unique waveshape is provided for each voice. Dotted and double dotted notes are supported, as well as sixteenth and thirty-second notes.

The COMPOSER allows music to be played at any tempo in any key. While the music plays, a changing random kaleidoscope pattern is displayed. This may be disabled to allow the user to display anything including the words to a song.

Music compiled using the COMPOSER may be played independent of all other software. The COMPOSER is menu driven making it extremely easy to use. Nearly 20 minutes of music is provided.

For reviews see June '83 Rainbow, p. 192 and May '83 Color Computer News, p.

COMPOSER (16K or 32K Cassette)	\$24.95
COMPOSER (32K Disk)	\$29.95

THE STEREO COMPOSER \$10?

Well not really. But when you consider that when you purchase the STEREO COMPOSER you get both the COMPOSER software and MUSICA software, the difference is very close to \$10.

The STEREO COMPOSER is a hardware music synthesizer that plugs into the cartridge slot of the CoCo. The STEREO COMPOSER contains two 8 bit digital to analog converters and two separate audio power amplifiers with separate volume controls to drive external speakers directly or your own home stereo system. The advantage of being able to use external speakers rather than the TV's built-in speaker is obvious. Using high quality D/A converters and two channels further increases music realism.

The STEREO COMPOSER comes assembled, tested, burned in, with all the necessary hardware and software and a 90 day warranty.

STEREO COMPOSER (C	Cassette or Disk)	79.95
STEREO COMPOSER (5	50 page manual for evaluation)	7.00

PLEASE PIRATE THIS TAPE

Yes you read that correctly. In order to give you the opportunity to hear our products, we are offering you a standard stereo audio cassette. Over 30 minutes of music developed using the COMPOSER, STEREO COMPOSER, and MUSICA are included. Your announcer is of course the VOICE. So listen before you buy if you must and spread the word by copying the tape for a friend.

Demonstration	Tape	(Stereo	Audio	Cassette)	 	\$7.00

THE VOICE

The **VOICE** is a hardware speech synthesizer that plugs into the Color Computer's cartridge slot. It uses the sophisticated SC-01 by VOTRAX to reproduce any word in English as well as other languages.

The VOICE has two outputs. Speech may be heard through the TV speaker or the built-in audio power amplifier with volume control may be connected to your own external speaker.

The VOICE comes assembled, tested, burned in, with all the necessary hardware and software, and a 90-day warranty. Runs in 16K, 32K, or 64K machines.

BINGO The VOICE announces the BINGO tiles while you play the game.

MATH TUTOR The VOICE tutors your child in learning arithmetic. HIGH LOW The VOICE gives you hints in guessing a number it has picked.

EDITOR This utility program will help you develop words phonetically.

THE VOICE (Hardware and programs above, Cassette or Disk) \$119.95 THE VOICE (40 page manual for evaluation)\$ 7.00

THE TRANSLATOR

The translator is a machine language program that uses a sophisticated algorithm and exception table to automatically convert text to speech. For example, A\$ = "THIS IS ALMOST TOO EASY" followed by calling a USR will allow the VOICE to speak. The translator will even allow you to type words in one language (i.e. French) and have the VOICE speak in another (i.e. German).

REACTION Test your reflexes as the VOICE gives you commands

SIMON Test your memory for numbers spoken by the VOICE.

THE TRANSLATOR (With programs above, Cassette or Disk)\$29.95

ESTHER

ESTHER is ELIZA plus. ESTHER illustrates the high level of artificial intelligence that computers have achieved. Perhaps you have heard of ELIZA that was developed at MIT in which the computer plays psychologist. In our version, the VOICE speaks just as the doctor would. And because it is completely machine language, responses are immediate. You'll be amazed!

ESTHER (32K Cassette or Disk) .

EDUCATION PACK 1

This package of 3 programs is intended for the pre-schooler. **ALPHABET** The VOICE speaks the A, B, C's as they are displayed enlarged. **NUMBERS** Enlarged numbers are displayed while the VOICE speaks them. COLORS The VOICE teaches your child the basic colors.

EDUCATION PACK 2

This package of 3 programs is intended for the elementary school child. HANGMAN The VOICE adds a new dimension to this favorite spelling game. SPELLING Test your spelling ability with the VOICE.

EDUCATION PACK 3

This package of 3 programs is intended for grades 5 through 8. STATES The VOICE tests your spelling ability of the states. CAPITALS So you think you know the capitals, let the VOICE see. PRESIDENTS Even adults will find this one challenging.

TERMINAL TALK

Coming soon. A talking terminal program. If you saw the movie WAR GAMES you know what this program can do. All you need is a modem and the VOICE. * Requires the Translator.

We accept CASH, CHECK, COD, VISA, and MASTER CARD orders. Shipping and handling US and Canada\$2.00 Shipping and handling outside the US and Canada\$5.00

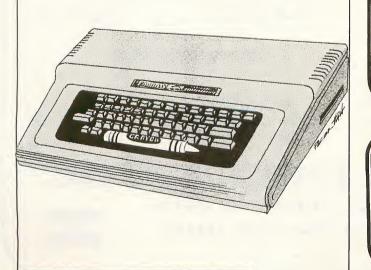
Illinois residents add 51/4% sales tax for the STEREO COMPOSER or THE VOICE.

Speech Systems 38W255 DEERPATH ROAD **BATAVIA, ILLINOIS 60510**

(312) 879-6880 CALL ANY DAY, ANYTIME TO ORDER. YOU MAY ALSO ORDER BY MAIL. WE SHIP FROM STOCK WITHIN 48 HOURS.

Program Listing 1. Thanksgiving Program

- 10 REM- A PILGRIM PROGRAM
- 20 CLS
- 30 PRINT "AT THE FIRST THANKGIVI
- NG WERE:"
- 40 FOR D = 1 TO 500 : NEXT D
- 50 FOR P = 1 TO 3
- 60 PRINT P "LITTLE,"
- 70 SOUND P,8 : SOUND P+10,8
- 80 NEXT P
- 90 PRINT " PILGRIMS."
- 100 SOUND 150,7 : SOUND 150+10,7
- 110 FOR P = 4 TO 6
- 120 PRINT P "LITTLE,"
- 130 SOUND P,8 : SOUND P+10,8
- 140 NEXT P
- 150 PRINT " PILGRIMS."
- 160 SOUND 155,8 : SOUND 150+10,7
- 170 FOR P = 7 TO 9
- 180 PRINT P "LITTLE,"
- 190 SOUND P,8 : SOUND P+10,8
- 200 NEXT P
- 210 PRINT " PILGRIMS -- AND, "
- 220 SOUND 155,7 : SOUND 155+10,7
 - : SOUND 200,17
- 230 PRINT " TEN LITTLE INDIAN GUESTS!!"
- 240 FOR S = 100 TO 140 STEP 10
- 250 SOUND S.6
- 260 NEXT S
- 270 GOTO 270



PRO-COLOR-SERIES

PRO-COLOR-FILE Enhanced

\$79.95 D

This high level data base development program offers the ability to track any type of information. From Mailing Lists to Expense Records, to Inventory or Court Trials, PRO-COLOR-FILE has the versatility to handle it.

60 Data fields
Upto 1020 Bytes per record
Use 1-4 Disk Drives
4 Color Data Entry Screens
28 User defined Equations
Scan File Alphabetically
Duplicate records
Duplicate fields

8 Report formats Summary Reports Screen Reports Page titles, numbering Sort on any Field Sort 3 Fields at once Sort any size file Select sub-sets of file

See Reviews in:

Color Computer News -- June 83 Hot CoCo -- August 83 Rainbow Magazine -- June 83

PRO-COLOR-FORMS

* NEW *

\$39.95 D

Generate customized letters by merging PRO-COLOR-FILE data files with a letter. Print a personalized letter to everyone on your list. PRO-COLOR-FORMS will place data anywhere on a full page, even within the text of a letter.

Embedded control codes 6 User designed forms 32 to 133 characters 7 to 66 lines

Have your data printed on pre-printed forms or design your own. Requires PRO-COLOR-FILE to use.

PRO-COLOR-DIR

* NEW *

\$24.95 D

Compile a master listing of all your directories in one data file. This utility program will read a diskette's directory and place the information in one master file. PRO-COLOR-FILE is then used to generate reports or search and update. PRO-COLOR-DIR will store:

Diskette ID name File name/Extension File type (Basic, ML, Data) Number of Sectors allocated ML Load and Execute address Date Created
Date Updated
Number of Grans allocated
Number of Sectors used
ML file length

Store 1000 entries! Requires PRO-COLOR-FILE to use.

See your local dealer or send check or money order to: Derringer Software, P.O. Box 5300, Florence, SC 29502 Visa, MasterCard customers call (803) 665-5676 after 6 pm. Add \$2.00 for Shipping and Handling No C.O.D.'s

> PRO-COLOR-FILE, PRO-COLOR-DIR, PRO-COLOR-FORMS (C) 1983 Derringer Software

All programs require 32k Color Computer Disk System
(Does not require joysticks!)

Circle No. 16 on Reader Service Card



TOMORROW'S PRODUCTS TODAY



INTRODUCING

JDBDOS

A 64K operating system for the color computer. Features that unlock the hidden power of the 6809.

INTRO. SPECIAL \$39.95

All orders postmarked after December 1, 1983 \$49.95

NEW

COLOR HOST

Allows remote access of the color computer. Perfect for COCO-BULLET. Break/Run, feature. Invisible to basic. ONLY \$34.95
COCO-BULLET bulletin board mate for COLOR HOST \$34.95

DSL'S GREATEST HITS

A 20 program collection of software. Word processor, games, utilities the perfect christmas gift for the color computer enthusiast.

\$39.95 TAPE

\$49.95 DISK

Electronic Calligrapher - The Hit of Rainbowfest.

Old English or Chancery Cursive

type font. Works with LP VIII or EQUIV.

Version for Gemini 10 or 15

Version for Epson w/Graftrax

BOTH TYPE FONTS \$18.95 DISK ONLY!

HAM PROGRAMS

Three New M/L Programs for Ham Radio use.

Super Contester I - 16K - \$14.95

Super Contester II - 32K - \$24.95

Keep track of 1400 entries in 16K or 2700 in 32K,

Sort, Print, Much More.

Country Locator - \$14.95

Enter Call Letters, Returns Beam Headings from any where in the USA, FAST

THE GENERAL

THE GENERAL Ledger program for the color computer. 32K required. 100 accounts, over 500 transactions.

Tape Based......\$39.95

Nelson Super Color Writer T. \$69.95 D. \$99.95

THE 32/64K GRAND SLAM

For "E" & "F" boards with 1.1 or 1.2 STD. ROM (EXEC 41175). Buy the best with a one year warranty to prove it. 15 min. solderless installation. optional tools include \$15.00 Deposit. (refundable).

ONLY \$75.00

THE 32K PIGGYBACK RAM SLAM

The original solderless kit still the finest available 15 min xn.

1 YEAR WARRANTY

ONLY \$49.95

Have one, and want 64K, just return it, with invoice for a \$25 credit on purchase of a GRAND SLAM.

COCO/ATARI JOYSTICKS

No adapter needed, plugs right in for arcade action.

\$14.95 EA.

2/\$28.00

RS-232 SWITCHER

2 or 3 way switch for RS-232.

2 way has test position for R/S Diagnostic Cart.

2 Way w/test \$29.95 3 Way \$39.95

DSL COMPUTER PRODUCTS INC.



P.O.BOX 1113 ● DEARBORN, MI 48121 313-582-8930 ● 313-582-3406 (Data)

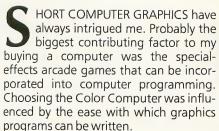


Michigan Residents Add 4% Sales Tax To Order Please include \$2.00 for 5 & H



STAR*

A very short graphics treasure.



I came up with "Star" by accident. I was playing with a program that plots a circle on an Atari computer and realized what it takes to draw a circle on most home computers. Then I drew 200 or so circles in the same amount of time on the Color Computer. It makes me want to thank Radio Shack or MicroSoft or Motorola (or whoever is responsible) for the powerful, responsive machine the Color Computer is.

Star requires 16K Extended Basic. I incorporated the Line statement with the PSET statement and produced what I believe is a truly creative graphics program. Ihope the simple beauty and artistic symmetry of this program will inspire some of you not-so-amateur programmers to incorporate this design into your programs.

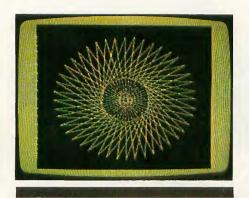
Show the program to your friends and neighbors who own more expensive machines. They will be amazed at the ease and simplicity with which a Color Computer operates.

Line by Line

Line 5 selects graphics mode, clears the screen, and picks color set.

Line 10 is the For/Next loop. I chose 44 as the final value, to put 45 points on the star.

Line 15 and Line 20 are the work-horse lines. B and C calculate sine and cosine



by David Lauta

values of A. D and E get values of sine and cosine for A+1. This is important because H and I plot B and C at the points of the star. D and E make the short leg of the star.

Line 30 is the line doing the actual

drawing. H and I are the points of the star, and F and G are the points the short leg is drawn to. The rest of the program just adds a little polish.

The simplicity of this program allows many easy changes. Selecting a different PMODE will change the appearance of the star. In Line 20 the values 128 and 96 could be changed to move the star off center. Caution should be used to make sure the star will fit on the screen. Changing the values 35 and 27 to smaller numbers will make the star smaller but make sure the star will fit on the screen. Lines 40, 45 and 50 could be changed to alter my finishing touches; delete them altogether, and build from there.

Program Listing. Star

- 1 REM MY STAR
- 2 REM WRITTEN BY
- 3 REM DAVID LAUTA
- 4 REM 61483, ROCHESTER N.Y.
- 5 PMODE 4,1:PCLS:SCREEN 1,0
- 10 FOR A=1 TO 44
- 15 B=SIN(A):C=COS(A):D=SIN(A+1): E=COS(A+1):B=B*3:C=C*3
- 20 F=(128+D*35):G=(96+E*27):H=(1 28+B*35):I=(96+C*27)
- 30 PSET(H,I,1):LINE(128,96)*-(H, I),PSET:LINE*-(F,G),PSET
- 35 NEXT A
- 40 FOR K=1 TO 35 STEP 2.5
- 45 CIRCLE(128,96),K,4
- 50 NEXT K
- 999 GOTO 999

From Our Closet To Yours...

The Official

Official TCCM Cap

Cool white mesh cap with choice of white or navy panel and visor.

Wardrobe Collection!

Official TCCM T-Shirt

100% cotton in red, royal blue, kelly green, dark green, gold, black, orange, maroon, white, columbia blue, and purple. S, M, L, XL.

YES! I need the latest in Color Computer fashion — please send me the following:

QTY.	ITEM	COLOR	SIZE	PRICE	S&H	TOTAL
	Сар			6.95	1.50	
	Adult T-Shirt			6.95	1.50	
	Youth T-Shirt			6.75	1.50	
	Adult Fashion Shirt			15.95	1.50	
	Youth Fashion Shirt			14.75	1.50	
	Jacket			42.50	3.00	
26.1						

Maine residents add 5% sales tax

TOTAL AMOUNT (incl. shipping & handling)

- Check or M.O. enclosed
- ☐ Visa ☐ MasterCard #___

Exp.___

Address _____

City_____ State___ Zip____

Mail to:

The Color Computer Magazine **CLOTHES CLOSET**

Highland Mill • Camden, ME 04843

Please allow 3-4 weeks for delivery.

Official TCCM Baby

Not for sale. But to dress him/her later on, T-shirts just like Mom's in navy blue or white, sizes S, M, L.

For the truly

fashion-aware, we offer the official TCCM Fashion Shirt our logo replaces the animal. Available in adult sizes S, M, L, XL, in your choice of white, navy blue, beige, royal blue, red, or kelly green. 50% cotton/50% polyester. Same shirt for the little ones in navy blue or white, sizes S, M, L.

And Baby, when it's

cold outside, you'll want our fully-lined Official TCCM Jacket. Oxford nylon shell, knit collar, raglan sleeves. Black only, in adult sizes S, M, L, XL.

Pregnant with Style. Give Color t

this Christmas—

The Brilliant Gift That Lasts All Year!

Now you can give your friends the most colorful Christmas ever with low-cost Gift Subscriptions to The Color Computer Magazine each issue loaded with —





FREE GAMES and UTILITIES to enjoy and keep.



TUTORIALS that increase computing know-how.



SOFTWARE and HARDWARE REVIEWS from the Color Computer perspective.



EQUIPMENT UPGRADES that keep pace with the technology.

AND MORE!

Save up to 37% off!

First Gift, only \$23.97! Each Additional Gift, only \$21.97! (37% off cover price)

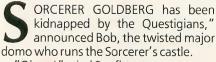
Why not solve your gift-giving problems right now with the brilliant gift that keeps on giving all year long!

Complete the Gift Card opposite and mail today to have that first big issue arrive in time for Christmas!



4K Color Basic

Oh no! The Sorcerer has been kidnapped by Questigians! Quick—solve these puzzles!



"Oh no!" cried Sunflower.

"What should we do?" wondered Poke. He and Sunflower were apprentice sorcerers.

"Do whatever you want," said Bob. "As for me, I've raided the Sorcerer's private supply of strawberry seltzer tonic, and I'm going to relax with a cool drink,

"You don't care about the Sorcerer's

plight?" asked Sunflower.

Of course I care," said Bob. "Without his magic, the strawberry seltzer tonic won't last forever." He mused to himself, "I wonder if the wizard made a will or if I simply become lord of the manor by default?

'As his apprentices, we've got to look for him," Poke said. Sunflower nodded.

"Whatever," said Bob, "but if you come back, I'm boss. I'd advise you not to go. It's dangerous out there."
"You forget we traveled overland to

get here," Sunflower reminded him.
"You came from the south, which has

only dragons, pitfalls, slime creatures, giant rabbits and ambulatory poison ivy. Questigian Country is to the north, and it really gets rough that way.

"What are the Questigians like?" Poke wanted to know.

by Richard Ramella

Bob shuddered. "The worst of the worst. You'll know when you meet one.'

"And why have they kidnapped the Sorcerer?" Sunflower asked.

"For the sheer exhilaration of being mean," answered Bob.

And with that encouraging thought, the boy and the girl left the castle on a cold, gray and windless morning, trekking north across a sere landscape of moors and winter-dead meadowland toward the blue mountains of the north.

In the afternoon they rounded a bend in a rocky path and came face to face with a Questigian. It was fat, half their size, and its face was faintly reminiscent of a bulldog's slobbery scowl. It stood on quite bowed legs. "Stand and deliver!" it commanded in a high voice, at the same time drawing back a pace.

"We're already standing," said Sun-

flower, "and I'm going to deliver a quick shot to that lightbulb you call a nose if you don't tell us quickly what you've done with Sorcerer Goldberg!"

The fierce and pugnacious Questigian responded by squealing and retreating forty feet up the path. "You'll never find him! No one can get past the clever traps we've set with Vortex, Jump Away Solitaire, Flat Cubes and Logicolor. Want to know the rules of play?

"Put this guy down for about two watts of brainpower," Sunflower murmured to Poke. "And take notes. It looks as if we're going to have to pass some tests before we find Sorcerer Goldberg."

The Questigian spilled out all the rules of play for the traps ahead, then hopped up the mountain and out of sight. When he was gone, Poke read his notes aloud.

Vortex

An orange square is drawn, and within each of its four sides is a small cyan section. At the center of the square is a magenta dot representing the player. The player dot is maneuvered by tapping the four directional arrow keys. The dot will be drawn back toward the center of the vortex if the secret, correct sequence of moves is not made. The correct sequence may be understood by the clue



provided by the Questigian: *Traveling* somewhat like a knight, some forward and half of that right. Escape comes when any of the cyan wall sections are touched. The game is lost if an orange section of the wall is touched.

Jump Away Solitaire

Forty-eight orange checkers are drawn within a white square. The checker at top left seems to have double length, but by tapping N for north, S for south, W for west and E for east, the player will see the checker is actually a cursor which can be moved to any of the 64 available positions on the board. The object is to eliminate as many checkers as possible, using regular diagonal checker moves. To jump and eliminate a checker, use these keys: left arrow key jumps northwest, right arrow key jumps northeast. The < key jumps southwest, and the > key jumps southeast. (The Questigians never revealed a winning strategy, so you're on your own here.)

Flat Cubes

Picture four cubes with various colors on each face. Now picture each of those cubes presented with its six sides shown in vertical rows. In this manner, the rows across show the front, bottom, top, back, left and right faces of each of the four cubes.

The object is to maneuver the cubes so the top four rows across — front, bottom, top and back — each has four different colors in it. Be aware that the moves you make simulate reality. Revolving a cube in any direction changes its faces logically.

Think of the four cubes as 1, 2, 3 and 4 reading across. The movement commands are L for left, R for right, U for up and D for down. Thus, the command 10 will turn the first cube upward one move. The command 3L would turn the third cube leftward one move.

Enter move commands when you see the prompt: DECISION? Illegal move commands are not allowed. The test then recognizes and acknowledges a winning position.

Logicolor

A hidden four-color code is generated. The object is to guess the code within 15 tries. Colors used in the code are yellow, blue, red, white, cyan and magenta. The code may be of four different colors, all the same or a combination of the six.

After the program flashes the words

PREPARE TO BREAK COLOR CODE, an orange cursor will appear at top right of the screen. This cursor can be moved among four positions on the line by tapping the left and right arrow keys. To set a color in any of the four positions, tap the first letter of the color chosen: Y for yellow, B for blue, R for red, W for white, C for cyan and M for magenta. The color will then blink on to the left of the cursor. You may change the color by simply setting another over it.

When you have set four colors on a line, tap the E key to register the turn. At this point the program checks your guess against the hidden code, and to the right of the line gives two kinds of clues: POS for correct color in correct position and COLOR for correct color in wrong position. Example: If you guess red-red-white-white and the hidden code is red-white-blue-blue, the clue message will be POS: 1 COLOR: 1, meaning the red guess is the right color in the right position and the white guess is the right color in the wrong position.

After clues are given, the orange cursor goes to the next line for another round. You have 15 tries to guess the code. If the code remains unsolved after that turn, the color code is shown. The program also acknowledges winning guesses.

Programs

Program Listing 1. Vortex 120 CLS(0) 320 S\$=CHR\$(255) 130 B=246 140 FOR T=1 TO 500 150 NEXT 160 A\$="LOGICOLOR" 170 FOR A=160 TO 223 180 PRINT @ A, CHR\$(143+(RND(7)*1 6));A\$; 190 PRINT @ B,A\$; CHR\$(143+(RND(7 400 J=0)*16)); 200 SOUND RND(15)*8,1

210 IF A=B THEN 220 ELSE B=B-1: 220 FOR T=1 TO 500 230 NEXT

240 PRINT @ 321, "PREPARE TO BREA K COLOR CODE ... ";

250 FOR T=1 TO 2000 260 NEXT 270 CLS(0)

280 L\$=CHR\$(8) 290 R\$=CHR\$(9)

300 D\$=STRING\$(8,128)

310 Z\$=CHR\$(128)

330 FOR A=1 TO 4 340 A\$=A\$+CHR\$(131+(RND(6)*16)) 350 B\$=B\$+RIGHT\$(A\$,1)+Z\$ 370 FOR A=0 TO 448 STEP 32 380 P=0 390 G=0

410 C\$=D\$ 420 B=1

430 PRINT @ A+B,S\$; 440 X\$=INKEY\$

450 IF X\$<>"E" AND X\$<>L\$ AND X\$ <>R\$ AND X\$<>"M" AND X\$<>"Y" AND X\$<>"B" AND X\$<>"R" AND X\$<>"W" AND X\$<>"C" THEN 440

460 IF X\$="M" OR X\$="Y" OR X\$="B " OR X\$="R" OR X\$="W" OR X\$="C" GOSUB 630

470 IF X\$="E" AND MID\$(C\$,1,1)<> Z\$ AND MID\$(C\$,3,1)<>Z\$ AND MID\$ (C\$,5,1) <> Z\$ AND MID\$(C\$,7,1) <> Z\$ GOSUB 670 ELSE IF X\$="E" THEN X\$=""

REAL-TIME was never so real...

We are pleased to announce the 1984

Color

wter___ Wall Calendar

Yes!	Please send me gifts for my friends ude \$1.50 shipping & h	calendars (l've include) at \$8.95 each. andling for each calendar ordered.)	! d
Total amou	unt \$	☐ Check or money order e	nclosed
□ VISA	☐ MasterCard	Account #	
		Ехр	
Name			
Address			
City		State Zip	
SEND C		e Color Computer Maga 84 CALENDAR	zine

Please allow 2-3 weeks for delivery.

Highland Mill, Camden, ME 04843

480 IF X\$<>"E" THEN PRINT @ A,C\$;: PRINT @ A+B,Z\$;: QQ=0 490 IF X\$=L\$ AND B>2 THEN SOUND B*20,1: B=B-2 ELSE IF X\$=R\$ ANDB<6 THEN B=B+2: SOUND B*20,1 500 PRINT @ A+B,S\$; 510 IF X\$="E" AND J=>4 THEN PRIN T @ A+B,Z\$;: NEXT A 520 IF PP=15 GOTO 530 ELSE PRINT @ A+B,S\$;: GOTO 440 530 PRINT @ 480, "GAME OVER. SEOU ENCE: "Z\$+B\$; 540 FOR T=1 TO 3 550 SOUND 147,3 560 SOUND 176,2 570 FOR G=1 TO 50 580 NEXT G 590 NEXT T 600 SOUND 147,2 610 SOUND 89,3 620 GOTO530 630 J=J+1 640 IF X\$="Y" THEN W=16 ELSE IF X\$="B" THEN W=32 ELSE IF X\$="R" THEN W=48 ELSE IF X\$="W" THEN W=

64 ELSE IF X\$="C" THEN W=80 ELSE IF X\$="M" THEN W=96 650 MID\$(C\$,B,1)=CHR\$(131+W)660 RETURN 670 00=1 680 PP=PP+1 690 K\$=B\$ 700 IF C\$=B\$ GOTO 850 ELSE FOR F =1 TO 7 STEP 2 710 IF MID\$(C\$,F,1)=MID\$(K\$,F,1)THEN P=P+1: MID\$(C\$,F,1)=Z\$: MID(K\$,F,1)=Z\$720 NEXT F 730 FOR F=1 TO 7 STEP 2 740 FOR Q=1 TO 7 STEP 2 750 IF MID\$(C\$,F,1)=MID\$(K\$,Q,1)AND MID(K\$,Q,1)<>Z\$ THEN G=G+1 : MID\$(K\$,Q,1)=Z\$: MID\$(C\$,F,1)=Z\$ 760 NEXT Q 770 NEXT F 780 PRINT @ A+10,""; 790 IF PP<10 THEN PRINT" "; 800 PRINT PP"- POS: "P"COLOR: "G; 810 FOR T=1 TO 10 more



The Best Selling Program for Young Children Now Available for: TRS-80 Color Computer-16K disk or cassette and TRS-80 Models I/III-32K disk or 16K cassette

Nine fun educational games for children ages $2\frac{1}{2}$ to 6

counterpoint software, inc. 4005 West Sixty-Fifth Street Minneapolis, Minnesota 55435

Please rush me Early Games for Young Children

Circle one.

Model I Disk Color Computer Disk Model I/III Cassette

Model III Disk	Color Computer Ca	ssette
Name		
Address		
City	State	Zip
☐ My check for \$29.9	5 is enclosed (Minnesota resider	nts add 6% sales tax).
☐ Charge to VI5A	☐ Charge to Mastercard	
Acct. No.	Expiration Date	
Circle No. 18 on Reader	Service Card	

Phone Orders: 800-328-1223 Minnesota: 612-926-7888

Educators Endorse: "Early Games can help children learn new concepts, information and skills, and also introduces them to the joys and benefits of home computers.'

Peter Clark, Faculty Institute of Child Development University of Minnesota

No adult supervision required. The Picture Menu gives children control. They can:

· Match Numbers

· Match Letters

· Count Colorful Blocks

· Learn the Alphabet

 Add Stacks of Blocks

· Spell their Names · Compare Shapes

Subtract Stacks of Blocks · Draw and

Save Colorful **Pictures**

nine games for \$29.95

```
820 SOUND RND(10)+150,1
830 NEXT
840 RETURN
850 N=N+1
860 IF N/2 = INT(N/2) GOSUB 1000 E
LSE GOSUB 1020
870 FOR T=1 TO 4
880 SOUND 176,1
890 SOUND 193,1
900 NEXT
910 FOR T=1 TO 4
920 SOUND 193,1
930 SOUND 204,1
940 NEXT
950 FOR T=1 TO 3
960 SOUND 210,1
970 SOUND 218,1
980 NEXT
990 GOTO 850
1000 PRINT @ 480, "WINNER IN"PP"T
URNS.
1010 RETURN
1020 PRINT @ 480, "THAT WAS VERY
GOOD!";
1030 RETURN
1040 END
```

Program Listing 2. Jump Away Solitaire

```
120 CLS(0)
130 PRINT @ 266," FLAT CUBES ";
140 FOR T=1 TO 500
150 NEXT
160 CLS(0)
170 CLEAR 350
180 FOR A=1 TO 61
190 K$=K$+CHR$(128)
200 NEXT
210 O$=CHR$(255)
220 Y$=CHR$(159)
230 B$=CHR$(175)
240 G$=CHR$(223)
250 FOR A=1 TO 2
260 0$=0$+0$
270 Y$=Y$+Y$
280 B$=B$+B$
290 G$=G$+G$
300 NEXT
310 S$=CHR$(128)
320 A$(1)=0$+S$+Y$+S$+Y$+S$+G$+S
$+B$+S$+B$+S$
```

```
330 A$(2)=0$+S$+0$+S$+B$+S$+Y$+S
$+B$+S$+G$+S$
340 A$(3)=G$+S$+G$+S$+O$+S$+Y$+S
$+B$+S$+O$+S$
350 A$(4)=B$+S$+G$+S$+G$+S$+G$+S
$+0$+S$+Y$+S$
360 Y=18
370 FOR X=0 TO 54
380 SET(X,Y,5)
390 NEXT
400 T$=""
410 BA$=""
420 L$=""
430 R$=""
440 F$=""
450 BO$=""
460 FOR A=1 TO 4
470 BA\$=BA\$+MID\$(A\$(A),1,5)
480 L=L+MID+(A+(A),6,5)
490 F$=F$+MID$(A$(A),11,5)
500 R=R+MID(A(A), 16, 5)
510 BO\$=BO\$+MID\$(A\$(A),21,5)
520 T$=T$+MID$(A$(A), 26,5)
530 NEXT
540 PRINT @ 0,F$; "FRONT ";
550 PRINT @ 32,F$;
560 PRINT @ 96,BO$; "BOTTOM";
570 PRINT @ 160,T$; "TOP";
580 PRINT @ 224, BA$; "BACK";
590 PRINT @ 320,L$;"LEFT";
600 PRINT @ 384,R$; "RIGHT";
610 FOR Y=2 TO 14 STEP 4
620 BL=0
630 GR=0
640 RE=0
650 YE=0
660 FOR X=0 TO 30 STEP 10
670 D=POINT(X,Y)
680 IF D=2 THEN YE=YE+1 ELSE IF
D=3 THEN BL=BL+1 ELSE IF D=8 THE
N RE=RE+1 ELSE IF D=6 THEN GR=GR
+1
690 NEXT X
700 IF GR=1 AND RE=1 AND BL=1 AN
D YE=1 THEN NEXT Y ELSE GOTO 780
710 PRINT @ 480, "WIN";
720 SOUND 147,1
730 SOUND 159,2
740 SOUND 147,2
750 SOUND 125,3
760 SOUND 89,5
770 GOTO 710
                            to page 42
```

COLORSOFT™ BUSINESS SOFTWARE

AT LAST! BUSINESS SOFTWARE DESIGNED FOR THE COLOR COMPUTER

- * MAKE YOUR COLOR COMPUTER A WORKING BUSINESS PARTNER *
 - * ALL PROGRAMS ARE MENU DRIVEN AND USER FRIENDLY *
 - * PROFESSIONALLY WRITTEN AND FULLY TESTED *
 - * AFTER-THE-SALE SUPPORT *

COLORSOFT tm GENERAL LEDGER

COLORSOFT tm General Ledger is ideal for the small business man who wants to take advantage of the time saving benefits of computerized accounting procedures. This package is designed for the businessman who is knowledgable of accounting principles and who wants a computerized accounting system with greater user control. The features and options of this package compare favorably to higher priced software.

FEATURES

"" USER FRIENDLY AND FULLY MENU DRIVEN ""
"" UP TO 96 USER DEFINABLE RECORD CATEGORIES ""
"" USER FLEXIBILITY IN ACCOUNT DESIGN AND ENTRIES ""
"" DETAILED USER'S MANUAL WITH SAMPLE TRANSACTIONS ""
"APPROXIMATELY 800 ACCOUNTS RECEIVABLE/PAYABLE FILES ""
"STYLED FOR THE ACCOUNTANT/BOOKKEEPING ORIENTED USER"
"" MENU PROMPTS MAKE ENTRIES EASY, FAST, AND EFFICIENT ""

"" MENU PROMPTS MAKE ENTRIES EASY, FAST, AND EFFICIENT "
COLORSOFT tm General Ledger is an integrated, journal-type double entry accounting package for a small business that includes General Ledger, Accounts Payable, and Accounts Receivable programs. Outputs of the system include an income statement, balance sheet, accounts payable and receivable status lists, accounts payable and receivable aging reports, journal reports, account listing and a closing summary. During each user established accounting period (monthly, quarterly, annually, etc.), it will handle accounts of up to \$1,000,000.00 for approximately 800 accounts payable/receivable. Accounts are automatically numbered and each transaction is carried separately so that an account number will correspond to a specific purchase rather than a an account number will correspond to a specific purchase rather than a specific vendor/customer.

Requires 16K and a Single Disk Drive. PRICE: \$129.95

COLORSOFT tm SMALL BUSINESS ACCOUNTING

The COLORSOFT tm Small Business Accounting package is ideal for the small businessman who wants to take advantage of the time saving benefits of computerized accounting procedures. This package is designed with this person in mind and as such, extensive computer or accounting experience is not required. The feature and options of this package are comparable to much higher priced software.

FEATURES

"" USER FRIENDLY AND FULLY MENU DRIVEN ""
"" USER DOES NOT NEED TO BE AN ACCOUNTANT ""
"" UP TO 32 USER DEFINABLE RECORD CATEGORIES ""
"" DETAILED USER'S MANUAL WITH SAMPLE TRANSACTIONS ""
"USER IS PROMPTED FOR COMPANION ENTRIES AS REQUIRED ""
"APPROXIMATELY 800 ACCOUNTS RECEIVABLE/PAYABLE FILES ""
"MENU PROMPTS MAKE ENTRIES EASY, FAST, AND EFFICIENT ""

*** MENU PROMPTS MAKE ENTRIES EASY, FAST, AND EFFICIENT ***
COLORSOFT Im Small Business Accounting is an integrated, ledgerless accounting package for a small business that includes Accounts Payable, Accounts Receivable, Sales, and Purchase Order.programs. Outputs of the system include an income statement, balance sheet, check register, accounts payable and receivable status lists, and accounts payable and receivable aging reports. During each user established accounting period (monthly, quarterly, annually, etc.), it will handle sales of up to \$1,000,000.00 and approximately 800 accounts payable/receivable. Accounts are automatically numbered and each transaction is carried separately such that an account number will correspond to a specific purchase rather than a specific vendor/customer. vendor/customer.

Requires 16K and a Single Disk Drive. PRICE: \$149.95

COLORSOFT MANAGEMENT SKILLS **SERIES I: BEING BOSS**

"BEING BOSS" is a collection of six programs and is the first in an ongoing series of computer assisted management development tools. Those who can benefit include corporate executives, managers, heads of teams, group leaders, supervisors, foremans, teachers, and parents. In fact, anyone who must take a leadership role can benefit from these programs.

- A. REFLECTIONS a self evaluation guide
 B. ASSERTIVENESS taking control as a leader
 C. MANAGEMENT STYLES how to approach the leadership role
 D. DECISION MAKING how to handle decision making
 E. COUNSELING helping others solve personal problems
 F. STRESS CONTROL taking care of yourself

Each program is in a multiple choice questionnaire format where the user is querried as to a response to a specified management situation. Tutorials help the user learn new management skills and insights. The programs include voice annotation from the author, Mr. Terry Barker. "BEING BOSS" is based in parton his forthcoming management books "BOSS TALK" and "THEORY C."

The series, "BEING BOSS", offers to the user the latest in management skill development concepts and should prove to be an invaluable TOOL for anyone who wishes to reach their full potential as a leader. The author has condensed week long intensive workshop material into this outstanding package. The accompanying user's manual is very well written and is easily understood by anyone.

Requires 16K and cassette. PRICE \$89.95

COLORSOFT tm ACCOUNTS RECEIVABLE

COLORSOFT tm Accounts Receivable is a full stand-alone accounts receiva-Business Accounting package. Accounts Receivable does not require the user to be an accountant; in fact, this is a highly user friendly system designed for dally use by the small businessman. The features and options of this system compare favorably with much higher priced software.

FEATURES

*** PROVIDES ACCOUNT AUDIT TRAIL *** *** ACCOUNTS ARE CARRIED BY CUSTOMER ***
*** USER FRIENDLY AND FULLY MENU DRIVEN ***

*** PREPARES INVOICES AND MAILING LABELS *** *** USER DOES NOT NEED TO BE AN ACCOUNTANT ***
*** DETAILED USER'S MANUAL WITH SAMPLE TRANSACTIONS ***

*** MENU PROMPTS MAKE ENTRIES EASY, FAST, AND EFFICIENT ***

COLORSOFT im Accounts Receivable provides the user with detailed audit trails and history files on all transactions by a customer. It also prepares invoices, mailing labels, aging lists, customer history reports, and an alphabetized customer listing. The user can define discount/net terms for commercial accounts and finance charge and minimum payments for revolving accounts.

Requires 16K and a Single Disk Drive. PRICE: \$89.95

USER'S MANUALS WITHOUT PROGRAM \$20.00 EACH (Refunded on Purchase) INCLUDE: \$2.25 Handling Per Order WRITE FOR FREE CATALOG

BRANTEX, INC.

COLOR SOFTWARE SERVICES DIV.

BUSINESS SOFTWARE GROUP P.O. BOX 1708, DEPT, R GREENVILLE, TEXAS 75401



TELEPHONE ORDERS (214) 454-3674 COD/VISA/MASTERCARD

ATTENTION DEALERS: WE OFFER THE BEST DEALER PLANS AVAILABLE

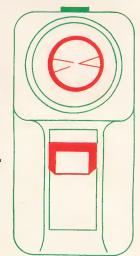
COLOR CABLES PLUS!



Tired of plugging and unplugging devices from the RS232 port of your Color Computer? Make your life easier. Buy our RS232 expansion cable and connect two devices at the same time. Just right for printers, modems, etc. Anything that plugs into the Color Computer will plug into this high quality cable.

RS232 Cable \$20.00 ... 29.95* 3 position

COLORCOM/E BONUS! Order COLORCOM/E and get the RS232 cable for only \$15.00. Save \$5.00.



OLORCOM/E

SMART TERMINAL PACKAGE

WE DIDN'T WAIT for the competition to catch up with us! We've added even MORE features to COLORCOM/E, our superb Smart Terminal program for the Color Computer. Compare before you buy. NOBODY offers you more!

- Complete Upload and Download Support * Automatic Capture of Files
- Online Cassette/Disk Reads and Writes
- 110, 300, 600, or 1200 Baud
- Full or Half Duplex
- Offline and Online Scrolling
- ROM Pack or Disk

- ★ Send All 127 ASCII Characters From Keyboard
- ★ Word Mode Eliminates Split Words
- → 7 or 8 Data Bits (Including Graphics Support)
- Preenter Data Before Calling (Saves \$\$'s) 🗼 Efficient Data Storage S-t-r-e-t-c-h-e-s Memory
 - 100% Compatible with Rainbow Connection's BBS's!

COLORCOM/E \$49.95

AND, our efficient storage and easy editing of received data makes printing to your printer offline a snap. Select any portion of the received data for printing. No need to print everything.

32K RAM Button	VIDEC 16K/3 Epsor Lowe Extending North "Gori Sc Color Disk Ir "Band CoCc perfor synthe
CoCo First Aid Kit — Be Prepared!	synthe
(2 6821s, 6809E & 6883) \$69.95 EPROM Programmer (2716,	text to
2732, 2764, and 68764)	add v

VIDEO PLUS — Superb video interface	\$24.95
16K/32K Upgrade Kit — Lowest price	\$25.95
Epson Printer Interface	\$49.95
Lowercase Board	\$59.95
Extended Basic ROM	\$69.95
Mini Modem with RS232 Cable	\$79.95
"Gorilla" Hi-Res Green	
	\$99.95
Color-80 BBS Software \$	115.00
Disk Interface — Spectrum Special \$	139.95
"Banana" Printer (Same as DMP 100) \$	249.95
CoCo Voice Synthesizer — A talking performance breakthrough!Hardware synthesizes using the VOTRAX Chip. Cotext to speech ML program. Allows create and edit custom dictionaries add voice to your Basic program in m	e voice ontains you to s. Now ninutes!
•	

THE SPECTRUM PADDLE -

Enjoy quicker response and higher game scores. Great for games with side-to-side action like Astro Blast, Space Invaders, Shooting Gallery and Clowns and Balloons. Includes "softtouch" fire button. "You have better control of the right to left movement than with any joystick we have seen so far"-Rainbow Review, Jan., 1983, Page 134. \$19.95

COLOR COMPUTER **EDITOR ASSEMBLER AND** DEBUGGER

"CCEAD is a high quality program and excellent value. CCEAD is a tool that no assembly language programmer can afford to be without.''—Rainbow Review, Feb., 1983.* . . . \$6.95

THE STRIPPER

Deletes REMarks, packs lines, and removes blanks. "How much Memory can you save? About 25% average."-Rainbow Review, Feb., 1983.* \$7.95

*Order both and save a buck! from SPECTRUM Projects

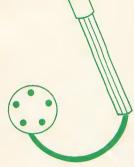


The must CoCo book for 1983. Contains a myriad of peeks and pokes, ROM and RAM upgrades, machine language backups, printer potpourri and more! Make your computer do things it never did before. . . \$14.95

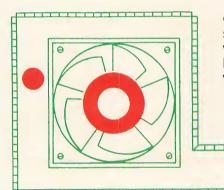


LIGHT PEN — Plugs right in to your joystick port and reads the colors off your screen. Includes four demo programs and is completely compatible with Computer Island's Fun-Pak software.

. \$19.95



FOUR-PIN MALE TO FOUR-PIN FEMALE — 15 FEET. Move your printer or modem to another location — easier use. \$14.95



coco cooler — Internal cooling system. Prevent heat buildup inside your Color Computer. "CoCo Cooler keeps things cool."—Rainbow Review, Dec., 1982, Page 39. . . \$49.95

NEW! TAPE UTILITY by Thomas Olk

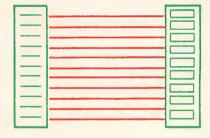
A powerful program that permits the user to easily maintain backup, and catalog both tape and disk programs.

- 1. TDR—Tape directory
- 2. COP-Tape to tape copy
- 3. PTD—List tape directory to printer
- 4. DIR-Directory of disk
- 5. PDR-Print disk directory
- 6. DTT—Copy file from disk to tape
- 7. TTD—Copy file from tape to disk
- 8. BAC—**Auto disk to tape backup**! Cassette or Disk - \$24.95

64K DISK UTILITY PACKAGE

- 1. 40K Tired of seeing 22823?
- ROMCRACK Now replace your ROMPAC Software or Disk!
- Software Print Spooler Tired of waiting for your printer? Output data to a RAM buffer and go back to programming! Now works with all printers 600 Baud or better.

64 Disk Utility Package - \$21.95 40k Program on Cassette - \$9.95



DISK INTERFACE/ROM PACK EXTENDER — **3 FEET.** Move your disks and ROM packs where you want them. Gold plated contacts eliminate corrosion. \$29.95

HIDDEN BASIC 1.0

Finally! A program written to protect your BASIC programs. HIDDEN BASIC 1.0 will modify your BASIC programs so these commands will not function:

CLOAD or CLOADM CSAVE or CSAVEM DEL or EDIT LIST or LLIST

The protected copy is not a BASIC program anymore. It is a special machine language program referenced by the BASIC interpreter. Once protected by HIDDEN BASIC there's no way to undo it!

Tape \$ 19.95

SPECTRUM PROJECTS

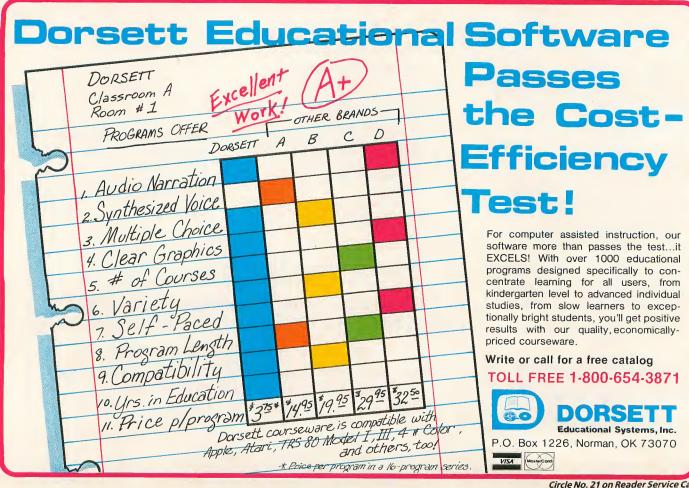
93-15 86th Drive, Woodhaven, NY 11421 (212) 441-2807 (VOICE) • (212) 441-3755 (DATA)

Add \$3 for Shipping and Handling
New York State Residents add appropriate taxes

DEALER/CLUB INQUIRIES WELCOME

Call the Rainbow Connection At (212) 441-3755 & (212) 441-3766 for Rainbow Programs and Reviews

♦ from page 38 780 BL=0 (W),11,5): MID\$(A\$(W),11,5)=MID\$790 GR=0 (A\$(W),6,5): MID\$(A\$(W),6,5)=MID800 RE=0(A\$(W),1,5): MID\$(A\$(W),1,5)=U\$810 YE = 0820 PRINT @ 448, "DECISION"; 970 IF P\$="L" THEN U\$=MID\$(A\$(W) 830 INPUT H\$ (1,5): MID\$(A\$(W),1,5)=MID\$(A\$(W),1,5)840 PRINT @ 448,K\$;),6,5): MID\$(A\$(W),6,5)=MID\$(A\$(850 W=VAL(LEFT\$(H\$,1)) W),11,5): MID\$(A\$(W),11,5)=MID\$(860 P\$=RIGHT\$(H\$,1) A\$(W),16,5): MID\$(A\$(W),16,5)=U\$870 IF LEN(H\$)>2 THEN 880 ELSE I F W<>1 AND W<>2 AND W<>3 AND W<> 980 IF P\$="U" THEN U\$=MID\$(A\$(W) 4 THEN 880 ELSE IF P\$<>"U" AND P (1,5): MID\$(A\$(W),1,5)=MID\$(A\$(W),1,5)\$<>"L" AND P\$<>"R" AND P\$<>"D" T),26,5): MID\$(A\$(W),26,5)=MID\$(AHEN 880 ELSE GOTO 950 (W), 11, 5): MID\$(A\$(W), 11, 5)=MID880 PRINT @ 448,K\$; (A\$(W),21,5): MID\$(A\$(W),21,5)=890 PRINT @ 480, "ILLEGAL CHOICE. TRY AGAIN."; 990 IF P\$="D" THEN U\$=MID\$(A\$(W) 900 FOR T=1 TO 1000 (1,5): MID\$(A\$(W),1,5)=MID\$(A\$(W),1,5)910 NEXT),21,5): MID\$(A\$(W),21,5)=MID\$(A920 PRINT @ 448,K\$; (W), 11, 5): MID(A(W), 11, 5)=MID930 GOTO 780 $(A^{(W)}, 26, 5)$: MID $(A^{(W)}, 26, 5)$ = 940 GOTO 400 U\$ 950 P\$=RIGHT\$(H\$,1) 1000 SOUND RND(8) *20,1 960 IF P\$="R" THEN U\$=MID\$(A\$(W) 1010 GOTO 400 ,16,5): MID\$(A\$(W),16,5)=MID\$(A\$1020 END



Program Listing 3. Flat Cubes

```
120 CLS(0)
130 Z$=CHR$(223)
140 U$=CHR$(94)
150 D$=CHR$(10)
160 L$=CHR$(8)
170 R$=CHR$(9)
180 B$=CHR$(255)
190 FOR A=0 TO 30
200 PRINT @ A,B$;
210 PRINT @ A+480, B$;
220 NEXT A
230 FOR A=0 TO 480 STEP 32
240 PRINT @ A,B$;
250 PRINT @ A+30,B$;
260 NEXT A
270 PRINT @ RND(28)+1,Z$;
280 PRINT @ 481+RND(28),Z$;
290 PRINT @ 32+(RND(12)*32),Z$;
300 PRINT @ 62+(RND(12)*32),Z$;
310 X=31
320 Y=15
330 SET(X,Y,7)
340 FOR A=1 TO 3
350 E=X
360 F=Y
```

```
370 C$=INKEY$
380 IF C$<>D$ AND C$<>U$ AND C$<
>L$ AND C$<>R$ THEN 370
390 J$=J$+C$
400 IF C$=L$ THEN X=X-1
410 IF C$=R$ THEN X=X+1
420 IF C$=D$ THEN Y=Y+1
430 IF CS=US THEN Y=Y-1
440 RESET(E,F)
450 SET(X,Y,7)
460 IF POINT(X-1,Y)=8 OR POINT(X
+1,Y)=8 OR POINT(X,Y-1)=8 OR POI
NT(X,Y+1)=8 THEN 550
470 IF POINT(X-1,Y)=6 OR POINT(X
+1,Y)=6 OR POINT(X,Y-1)=6 OR POI
NT(X,Y+1)=6 THEN 590
480 NEXT A
490 IF J$=L$+L$+U$ OR J$=U$+U$+R
$ OR J$=R$+R$+D$ OR J$=D$+D$+L$
THEN J$="": GOTO 330
500 RESET(X,Y)
510 IF Y>15 THEN Y=Y-3 ELSE IF Y
<15 THEN Y=Y+3
520 IF X>31 THEN X=X-3 ELSE IF X
<31 THEN X=X+3

    more
```

Talk is Cheap!

You want your color computer to talk, but how much will it cost?

\$50...\$100...\$200...NO!

HOW ABOUT \$2995?

SPEAK UP!™ is a machine language Voice Synthesizer program for your TRS-80 Color Computer.* It is 100% software. Nothing else to buy. Best of all, YOU can make basic programs talk!

16K and 32K versions on one cassette. Has text to speech capability.

*T.M. Tandy Corp.

16k minimum

It's easy to use, and will say virtually anything!

Talk really is cheap!

Reviewed in the April issue of Rainbow.

COD orders, checks accepted - NO DELAY WE PAY POSTAGE

1-800-334-0854, ext. 890 Except North Carolina







Classical Computing, Inc. P.O. Box 3318
Chapel Hill, NC 27515



- Upper Deck for TV
- Pull-Out Shelf for Keyboard and Cassette or Video Game
- Lower Deck for Printer
- Storage Compartment and Paper Tray

DIMENSIONS: Height 34"

Width 31½" Depth 20"

Made of beautiful oak wood, the TV-Computer Combo will be attractive in any room in your home.

WOXALL WOODCRAFT

2nd & Walnut St., Green Lane, PA 18054 215-584-0522

Please send me TV-Computer Combos. \$248.00 plus UPS and handling. Less 10% unfinished. PA residents please include 6% sales tax. Amount enclosed \$ SHIPPED KNOCKED, MINOR ASSEMBLY REQUIRED Dark Finish Unfinished
Name
Address
Signature
Phone Exp
Woxall Woodcraft, 2nd & Walnut St., Green Lane, PA

```
530 J$=""
540 GOTO 330
550 SOUND RND(13)*10,3
560 N=N+1
570 IF N/2=INT(N/2) THEN PRINT @
 230, "D I S A S T E R "; ELSE
PRINT @ 230," DISASTER"
580 GOTO 550
590 PRINT @ 230,"F R E E D O M
600 GOSUB 640
610 PRINT @ 230,"
                   FREEDO
M";
620 GOSUB 640
630 GOTO 590
640 SOUND 204,3
650 SOUND 193,2
660 SOUND 185,2
670 SOUND 176,2
680 SOUND 185,2
690 SOUND 193,2
700 N=N+1
710 IF N/2=INT(N/2) THEN SOUND 1
76,4: RETURN
720 SOUND 176,2
730 SOUND 147,2
740 RETURN
750 END
```

Program Listing 4. Logicolor

```
120 CLS(0)
130 P=48
140 K$="JUMP AWAY"
150 Q$="SOLITAIRE"
160 N$="N"
170 E$="E"
180 S$="S"
190 W$="W"
200 U$=CHR$(44)
210 D$=CHR$(46)
220 L$=CHR$(8)
230 R$=CHR$(9)
240 Y=0
250 FOR X=0 TO 48
260 \text{ SET}(X,Y,5)
270 \text{ SET}(X,Y+27,5)
280 NEXT X
290 X=0
300 FOR Y=0 TO 27
310 SET(X,Y,5)
320 SET(X+48,Y,5)
330 NEXT Y
340 FOR Y=3 TO 24 STEP 3
```

350 FOR X=3 TO 45 STEP 6

360 IF X>9 AND X<39 AND Y>6 AND

```
Y<21 THEN 380
370 SET(X,Y,8)
380 NEXT X
390 NEXT Y
400 K=1
410 FOR A=186 TO 474 STEP 32
420 PRINT @ A, MID$(K$, K, 1);
430 PRINT @ A+4, MID$(Q$, K, 1);
440 K = K + 1
450 NEXT A
460 X=3
470 Y=3
480 A$=INKEY$
490 IF A$<>N$ AND A$<>S$ AND A$<
>E$ AND A$<>W$ AND A$<>L$ AND A$
<>R$ AND A$<>U$ AND A$<>D$ THEN
530
500 IF A$=S$ AND Y=24 OR A$=N$ A
ND Y=3 OR A$=E$ AND X=45 OR A$=W
$ AND X=3 THEN 530
510 IF A$=S$ THEN Y=Y+3 ELSE IF
A$=N$ THEN Y=Y-3 ELSE IF A$=W$ T
HEN X=X-6 ELSE IF A$=E$ THEN X=X
+6
520 RESET(A,B)
530 SET(X,Y+1,8)
540 A=X
550 B=Y+1
560 IF X<15 OR Y<9 THEN 570 ELSE
 IF A$=L$ AND POINT(X,Y)=8 AND P
OINT(X-6,Y-3)=8 AND POINT(X-12,Y)
-6)=0 THEN RESET(A,B): RESET(X,Y
): RESET(X-6,Y-3): X=X-12: Y=Y-6
: P=P-1: SET(X,Y,8)
570 IF X>33 OR Y<9 THEN 580 ELSE
IF A$=R$ AND POINT(X,Y)=8 AND P
OINT(X+6,Y-3)=8 AND POINT(X+12,Y)
-6)=0 THEN RESET(A,B): RESET(X,Y
): RESET(X+6,Y-3): X=X+12: Y=Y-6
: P=P-1: SET(X,Y,8)
580 IF X<15 OR Y>18 THEN 590 ELS
E IF A$=U$ AND POINT(X,Y)=8 AND
POINT(X-6,Y+3)=8 AND POINT(X-12,
Y+6)=0 THEN RESET(A,B): RESET(X,
Y): RESET(X-6,Y+3): X=X-12: Y=Y+
6: P=P-1: SET(X,Y,8)
590 IF X>33 OR Y>18 THEN 600 ELS
E IF A=D$ AND POINT(X,Y)=8 AND
POINT(X+6,Y+3)=8 AND POINT(X+12,
Y+6)=0 THEN RESET(A,B): RESET(X,
Y): RESET(X+6,Y+3): X=X+12: Y=Y+
6: P=P-1: SET(X,Y,8)
600 PRINT @ 26, "SCORE"
610 PRINT @ 58,P" ";
620 GOTO 480
630 END
```

Featured at COLOR EXPO '83

Superb Disk Based Data Base
\$59.95 16K EXB

BIG FILE and FAST FILE



SOFTWARE

Adventure in Tower Castle Cube Solver Planetarium Galaxy File Cabinet Report Programmer's Tool Kit Co-Co Writer (tape) Co-Co Writer (disk) Addition Thrills and	32K EXB 16K EXB 16K EXB 16K EXB 16K EXB 16K EXB 16K 16K EXB 16K EXB	\$17.95 \$19.95 \$19.95 \$19.95 \$29.95 \$24.95 \$28.95 \$34.95 \$44.95
Subtraction Action	16K EXB	\$14.95
Question and Answer	16K EXB	\$17.95
Super Flash Cards	16K EXB	\$15.95
Roman Numerals: Arabic		
Numbers	16K EXB	\$16.95

ALSO Progams for the MC-10 Shipping add \$2.00, COD add \$1.50

MORETON BAY SOFTWARE

A Division of Moreton Bay Laboratory



316 CASTILLO STREET SANTA BARBARA, CALIFORNIA 93101 (805) 962-3127

California Residents, Add 6% Sales Tax to Orders



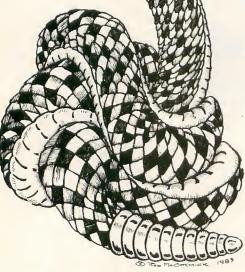




16 K Extended Basic or 32K EDTASM ROMpal



Slip-sliding away.



S LITHER, ORIGINALLY WRITTEN by Don McGarry, appeared in the November, 1982, Color Computer News.

I liked the game so much I decided to translate it into machine code. The game involves guiding a hyperactive "snake" around the screen, trying to run into targets, scoring as you go. To complicate and frustrate, you can't double back on yourself or run into the wall at the edge. To top things off, the snake grows longer, and longer, and longer...

I wrote my version using EDTASM+ on a 32K machine. All the benefits of speaking directly to the machine are here: smoothness, speed, and the ability to do things that are difficult or impossible in Basic.

My version of Slither has two special enchancements over the original. It has eight selectable speeds; the slowest is slightly faster than the Basic version, while the fastest is very, very fast. After the snake reaches a length of 200, it stops growing but speeds up, and the score-sound rises in pitch.

by Stephen P. Allen

How to Play

The Basic version asks if you want in-The program is relocatable to any suitable page boundary in RAM (i.e., \$1000, \$1100, and so on). To have both versions co-resident in a machine, type PCLEAR 1 Enter. CLOAD the Basic game. Then: CLOADM "SLITHER". Now you can RUN the Basic or EXECUTE the machine language at will

structions, the machine code version asks at what tempo you'd like to play, from 1 to 8. Answering either question starts the game.

After all targets are placed, there is a pause for a few seconds for you to put your fingers onto the arrow keys. Using them, guide the snake toward a target as it "grows" out of the lower right hand corner of the screen.

There are always a number of targets on screen, so don't panic if you miss. You can't cross yourself, so don't get trapped into "death spirals." Actually, pressing two arrow keys simultaneously gets you going diagonally; and, if you can aim it right, you can cross a diagonal with another diagonal. Watch out that you don't try to "go into reverse," as it isn't locked out (Right Arrow works when moving left, and results in a crash).

You have five crashes to use up before the score is final, but if you get tired you can press Break. The machine code version will return to the Enter Tempo prompt, where pressing Break again will return you to Basic.

Alterations

If you would like to alter this program, start with the following on a 32K machine (source and object won't fit into 16K together): Insert the EDTASM+ program pack and turn on the machine. Do not load the program yet!

Get into ZBUG (type: z Enter). Type: W Enter FD/7000 Down Arrow 2000 Enter GC006 Enter. This protects memory for assembling the game directly to RAM.

Type in or load the program (make sure you leave out the comments), and make the following changes:

Delete Line 130. Change Line 140 to: SETDP \$70. Replace Line 5320RTS with swi.

Assemble the program with these commands: A/IM/MO/WE.

Now you can manipulate the program to your heart's content, setting breakpoints, single-stepping, examining and changing instructions and memory. Be sure to save the source code on tape first!

The Program

I made generous use of the 6809's ability to manipulate 16-bit data. For instance, LDD PX loads A with PX and B with PY. The Direct Page is organized with this in mind, as is GETPOS.

The sound routine provides the timing of the game, in addition to sound. SOUND executes every time through the main loop, whether or not any sound is produced.

The sound routine works by putting two values out to the D/A converter, SNDBYT and O. No sound is produced if SNDBYT contains a zero. A value of \$FE in SNDBYT produces maximum volume.

This program uses two values, \$70 for score and \$8E for crash.

The main loop loads the B register with TEMPO and calls SOUND. The CLR SND BYT command occurs upon return, so there will be only one score-sound per score.

You can alter the speed of the snake in two ways. TEMPO contains the number of cycles of sound that will be produced. To speed up the snake, decrease the number of cycles. TTBL stores the eight possible values for TEMPO.

The other way to change the game's tempo is to alter SDELAY, which controls the pitch of the tone. This is done when the snake's length reaches 200. The less time SOUND spends on one cycle, the less time it spends on the entire routine.

GETPOS determines the screen position for a pair of coordinates. Upon entry, the A register has the X coordinate and the B register has the Y coordinate. Upon return, the X register has the screen location and the quadrant is in BITSET.

Once you understand the format for SemiGraphics 4, GETPOS is easy (see diagram). In hexadecimal, the colors are \$80 through \$FO. The four least significant bits determine which quadrant(s) will be set

CLR BITSET, INC BITSET puts a 1 in BITSET without disturbing the A or B registers. BITA #1 tells you whether the X coordinate is odd or even. BIT is the same as AND, except that it doesn't change the contents of the register — it's a test that sets the zero and sign flags as if AND had been performed. BITA #1 on an odd number in the A register returns a non-zero result, because any odd number has a 1 in its least significant bit. If the X coordinate is odd, set quadrant 1 or 4. If the X coordinate is even, set 2 or 8.

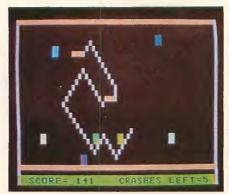
On even X coordinates ASL BITSET multiplies BITSET by 2. Same for the Y coordinate, except that ASL is done twice, which multiplies BITSET by 4.

1560 ADDA #4 is the same as ADDD #\$400, but more compact. \$400 is the start of display memory.

Arthur Metheney wrote the random number generator for the 6502 and presented it in the August, 1982 issue of 80 Micro. He says that the sequence of numbers generated will not repeat itself until 232 passes. Lines 3540 – 60 get the value of TIMER to seed the random number generator and make it truly random.

HEXDEC has two parts: it converts a number in the D register (0 – 9999) into a string of decimal digits in RESULT, and displays them at the screen address pointed to by the U register.

Lines 3510 – 30 set up a relocatable Direct Page (DP) register. BITSET is the first byte of program memory. It is also



"Slither" In Progress

the first byte of a block of variables that will be considered to be on the Direct Page. Assuming the program is assembled at \$3000, if \$30 is put in the DP register you can access these variables more quickly and efficiently by specifying only the last half of their address with Direct Page Addressing.

However, I wanted to be able to move these variables around with the program, so that no matter where the program is loaded in memory the variables would go with it. I needed a way to automatically adjust the DP register; these three instructions do it. If you CLOADM" SLITHER",&H4000, the DP register is accordingly set to \$70 when the game is run, and the variables are snuggled up to the

rest of the program, making a nice, compact unit.

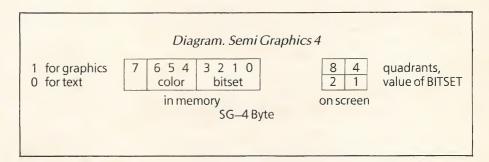
Line 3570 turns off the regular interrupt. Basic uses the interrupt to time sound and increment TIMER. Unfortunately, that interruption every 1/60 second gives the warbly tone of a defective power supply to Basic sound. This program doesn't use the interrupt, and turning it off helps make the sound clean. Before Returning to Basic it turns the interrupt back on.

Lines 3580 - 90 put a negative number in TMPONO (tempo number). The only other possible values for TMPONO are 0 - 7, all positive. \$FF is a flag to the computer, indicating that this is the first game and there is no last tempo.

4350 LDD #\$20CD Fill the arrays with dummy addresses. Register A has \$20, or 32 decimal. This goes into the X and Y arrays. When the snake grows, it does so by resetting position (32,32), which is just off the screen (try that in Basic!). The count in Register B, \$CD, equals 205, the size of the arrays.

1860 CLRA makes a 16-bit number in the D register from an 8-bit unsigned number in the B register. Sign EXtend (SEX) would do the same thing for signed numbers (where the most significant of the 8 bits is assumed to be the sign).

Many thanks to Don McGarry for permission to reprint his game, and to everyone who helped.



Program Listing. Slither — Basic OX=DX:OY=DY:DX=0:DY=0:C=0510 IFPEEK(UP)=KP THENDY=-1:C=1 520 IFPEEK(DN)=KP THEN DY=1:C=1 530 IFPEEK(LT)=KP THENDX=-1:C=1 IFPEEK(RT)=KP THEN DX=1:C=1 540 550 IF C=0 THEN DX=OX:DY=OY PX=PX+DX:PY=PY+DY 570 WX(HP)=PX:WY(HP)=PY:HP=HP+1580 IF HP>EL THEN HP=0 ♦ to page 50



PROCLAMATION

Contractor weekend

WHEREAS, THE LOS ANGELES COLOR COMPUTER USERS GROUP IS A NONPROFIT ORGANIZATION CREATED TO INFORM THE PUBLIC THROUGH LECTURES AND CLASSES ABOUT COMPUTERS AND TECHNOLOGY; AND

WHEREAS, THE WEEKEND OF NOVEMBER 4-6, 1983 THE LOS ANGELES COLOR COMPUTER USERS GROUP WILL BE HOSTING A CONVENTION ENTITLED "COLOR COMPUTER EXPOSITION"; AND

WHEREAS, THIS EXPOSITION WILL PROVIDE FREE LECTURES AND CLASSES ABOUT COMPUTERS, AND A CLASS ON PROGRAMMING, ALL OPEN TO THE PUBLIC, EMPHASIZING "EDUCATION THROUGH TECHNOLOGY":

NOW, THEREFORE, I, TOM BRADLEY, MAYOR OF THE CITY OF LOS ANGELES, DO HEREBY PROCLAIM NOVEMBER 4-6, 1983 AS "COLOR COMPUTER WEEKEND — EDUCATION THROUGH TECHNOLOGY" AND URGE THE CITIZENS OF LOS ANGELES TO ATTEND THE LOS ANGELES COLOR COMPUTER USERS GROUP EXPOSITION.

NOVEMBER, 1983

Dom Bradley

Use the reservation form below to save time, save money at Color Expo '83!

Share the fun and excitement of **Color Expo '83** with thousands of Color Computer enthusiasts from the fifty states and around the world!



- ★ Meet the Color Computer personalities you've only read about until now!
- ★ Get advance demonstrations of the hottest new products!
- * Win Color Computer hardware and software!
- ★ Upgrade your computing skills with hands-on exhibits and seminars!

Friday, November 4, 4—10pm Saturday, November 5, 10am—6pm Sunday, November 6, 10am—4pm

The Pasadena Center Conference Building Pasedena, California

Save \$3 off the price of a regular ticket good for all three days of Color Expo '83 and avoid standing in lines the day of the show! Simply fill out and detach the coupon below and return it with your check or money order for \$15 to:

Color Expo '83
Tickets
Highland Mill
Camden, ME 04843

For hotel room at special ColorExpo'83 rate, call the Pasadena Holiday Inn Convention Center at 213-449-4000 (make sure you tell them you're with ColorExpo'83).

Bonus! FREE Color Expo '83 poster for the first 200 ticket buyers!

YES! Please send tickets for Color Computing event of the year!	· · · · · · · · · · · · · · · · · · ·	☐ MASTERCARD ☐ VISA
NAME		PHONE
CITY	STATE	ZIP
AFFILIATION	oun company CoConut etc.)	

Mail to: Color Expo'83/Tickets/Highland/Mill/Camden, ME 04843

COLOR COMPUTER Systems SOFTWARE

DISK COLORCOM/E

The Intelligent Communications Package

COLORCOM/E, the most popular smart terminal program for the Color Computer, has just gotten smarter. In fact, from now on, we're going to call it The Intelligent Terminal program.

The new DISK COLORCOM/E contains a unique COMMAND MODE that allows you to set up complete communications sessions in advance. Anything you normally do from the keyboard DISK COLORCOM/E can do all by itself. Log-on, log-off, read and store messages, disconnect, transmit and receive files, dial auto-dial modems, - anything! DISK COLORCOM/E will even make decisions based upon how the host responds.

Here are some examples of how YOU might want to use the new DISK COLORCOM/E.

- Call your favorite bulletin board, download all messages addressed to you, log off, and write the messages to a disk file. AND do all of this with one keystroke!
- · Call Dow Jones, log on and get the latest prices on your favorite stocks, and then log off. Again all with ONE keystroke.
- . With an Autodial modem let COLORCOM/E Make your calls for you at 3:00 A.M. when rates are cheap. Then read the results with your morning coffee.

In addition we've added 64K support and your choice of number of characters per line. Of course you still get the regular COLORCOM/E features such as upload/download, graphics, easy storing and printing of data, and much more. For 16, 32 or 64K disk systems.

COLORCOM/E Disk \$49.95

COMPLETE YOUR WORD PROCESSOR

SPELL - RITE

THE Cassette Spelling Verifier

You've got the best word processor. Now complete your system with the best spelling verifier. Spell-Rite is a convenient, fast way to insure that all of your documents are letter perfect Spell-Rite was designed specifically for cassette-based word processors. Like Yours!

Spell-Rite is EASY to use, completely menu driven.

Spell-Rite is FAST! You can verify a 1000 word document in under 9 minutes - including cassette I/O.

Spell-Rite is COMPLETE. It comes with its own 10,000 + word dictionary which you can expand. Also included is a superb manual.

Spell-Rite works with any word processor that generates ASCII tape files, such as Color Scripsit, Super Color Writer and Telewriter 64. 32K of RAM and Extended Basic are required.

Cassettes and manual \$59.95

Send check or money order for total purchase price, plus \$1.50 S&H. Charge cards: Include all embossed information. □ Spell-Rite □ Send Free Catalog ☐ Disk Colorcom/E P.O. Box 180006 SEND to Eigen Austin, Texas 78718 Systems (512) 837-4665 Name Address

```
♠ from page 47
590 PT=POINT(PX, PY): IF PT<1 THEN
 620
600 IF PT=WC THEN 2000
610 GOSUB 1000
620 SET(PX, PY, WC)
630 RESET(WX(TP), WY(TP))
640 TP=TP+1:IF TP>EL THEN TP=0
650 GOTO500
1000 \text{ SC=SC+PT}
                   'SCORE
1010 SOUNDT1,1
1020 \text{ PB=SW*INT}(PY/2) + INT(PX/2)
 + UL
1030 POKE PB, BL
1040 PRINT@LL, USING PR$; SC, CT-CS
1050 EL=EL+1-(PT>3)-(PT>5)
1060 IF EL>EM THEN EL=EM
1100 TL=RND(RH) *SW+RND(RW)+UL
1110 IF PEEK(TL)/DV<>INT(PEEK(TL
)/DV) THEN 1100
1120 IF TL=PB THEN 1100
1130 POKE TL, CL(PT)
1140 RETURN
                           'CRASH
2000 FOR I=1 TO 5
2010 SET(PX, PY, WC)
2020 SOUND T2,1
2030 RESET(PX, PY)
2040 SOUNDT3,1
2050 NEXT I
2060 CS=CS+1
2070 \text{ FOR } I=0 \text{ TO EL}
2080 \text{ WX}(I) = 0 : \text{WY}(I) = 0
2090 NEXT I
2100 IF CS=CT THEN5000 ELSE4080
              'DRAW BORDER
3000 CLS0
3010 \text{ FOR } I = 1 \text{ TO } 62
3020 SET (I,1,WC):SET(I,28,WC)
3030 NEXTI
3040 \text{ FOR } I=1 \text{ TO } 31
3050 SET(1,I,WC):SET(62,I,WC)
3060 NEXTI
3070 RETURN
4000 \text{ DIM } WX(205), WY(205):WC=8
4010 CT=5: UL=1024: LL=481: WC=8
: BL=128: RW=30: RH=13: SW=32
4020 T1=176: T2=89: T3=58: EM=20
0: DV = 16
4030 UP=341: DN=342: LT=343: RT=
344: KP=247
4040 CL(1)=143: CL(2)=159: CL(3)
=175: CL(4)=191: CL(5)=207: CL(6
)=223: CL(7)=239
4050 PR$=" SCORE=####
                             CRASHES
 LEFT=# "
```

4060 GOSUB3000: GOSUB6000
4070 SC=0: CS=0
4080 EL=10: HP=9: TP=0
4090 PX=60: PY=27
4100 GOSUB3000
4110 PRINT@LL, USING PR\$; SC, CT-CS
;
4120 DX=0:DY=-1
4130 FOR PT=1 TO 7
4140 GOSUB1100
4150 NEXT PT
4160 GOTO 500
5000 IF SC>HS THEN HS=SC
5010 CLS:PRINT@167,USING "YOUR S CORE WAS ####";SC
5020 PRINT@231, USING "HIGH SCORE
IS ####"; HS
5030 PRINT@295,"WANNA PLAY AGAIN
?"
5040 AN\$=INKEY\$:IF AN\$="Y" THEN4
070
5050 IF AN\$<> "N" THEN5040
5060 CLS:END
6000 TI\$(0)="SLITHER":TI\$(1)="sl
ither"
6010 I=1:J=0
6020 PRINT@481," NEED INSTR
UCTIONS? ";
6030 PRINT@204, LEFT\$(TI\$(J), I);
6040 I=I+1:IF I=8 THEN I=1:J=ABS
(J-1)
6050 SOUND 60 + 5*I - 10*I*J,2 6060 AN\$=INKEY\$: IF AN\$="N" THEN
RETURN
6070 IF AN\$<>"Y" THEN 6030
6080 CLS:PRINT@12,"SLITHER"
6090 PRINT"SCORE AS MANY POINTS
AS YOU CAN BEFORE YOU CRASH "CT"TIMES."
6100 PRINTTAB(10)CHR\$(138)" "CHR
\$(133)," 1 POINT"
6110 FOR I=2 TO 7
6120 PRINTTAB(10)CHR\$(138) CHR\$(
CL(I))CHR\$(133),I"POINTS"
6130 NEXT
6140 PRINT" THE ARROW KEYS CONTR
OL YOUR DIRECTION. YOU CAN ALSO MOVE DIAGONALLY. THE 'SNA
REI CERS LONGED VEWED EVER MY
KE' GETS LONGER AFTER EACH TA
6150 PRINT@485,"PRESS <enter> TO</enter>
BEGIN";
6160 IF INKEY\$ = CHR(13)$ THEN R
ETURN ELSE6160

HARDWARE SPECIALS

26-3026 Color Computer 2 16k	\$214.95
26-3027 extended CoCo 2 16k	\$289.95
26-3003 64k Extended CoCo	\$369.95
26-3011 MC-10 Micro CoCo	\$104.95
26-1261 TP-10 Thermal Ptr.	\$89.95
26-1192 CGP-115 Printer	\$179.95
C. Itoh Banana 50 cps Ptr.	\$249.95
26-1068 CGP-220 Color Ptr.	\$639.95
Hayes SM1200 Smartmodem	\$579.95
Hayes SM300 Smartmodem	\$239.95
RS D.C. Modem 1	\$129.95
RS D.C. Modem 2	\$215.95

ACCESSORIES

Extended Basic Rom	\$69.95
RS Disk Controller	\$169.95
32/64k Memory Upgrade Kit	\$69.95
1.1/1.2 Color Basic Rom	\$29.95
26-3022 CoCo Drive 0	\$349.95
26-3029 CoCo 2 Drive 0	\$369.95
26-3023 Drive 1, 2, 3	\$249.95
Amdek Disk Drive	\$569.95
Kraft Joystick	\$49.95
Wico Joystick	\$29.95
Wico Adapter	\$19.95
26-3020 RS Modem/Ptr. Cable	\$5.95
Cable for Hayes Modem	\$19.95
26-3013 16k Upgrade / MC-10	\$44.95
26-3016 Keyboard Kit	\$34.95
Super Pro Keyboard Kit	\$69.95
26-3024 Multi-Pac Interface	\$159.95
Verbatim Disks	\$27.95
Elephant Memory Disks	\$25.00

TOLL FREE 1-800-251-5008

TENNESSEE 1-800-545-2502







Program next page

DELKER ELECTRONICS, INC. P.O. BOX 897 DEPT D SMYRNA, TN 37167

Prices do not include shipping. All items subject to availability.

All of the above units covered by our 120 day carry in warranty. (d) denotes "Delker" (200ns) memory guaranteed for 1 year. TRS-80 Trademark Tandy Corporation. Prices subject to change without notice.

Program Listing. Slither—Assembly Language

Note: The lines generated by FCC instructions in this listing have been artificially compressed to save space.
—Eds.

	#3 BREAK? DONE YES #341 IN ROLLOVER MARKE		. CATENERS SHOW KEYPRESS ,X+ DOWN ARROW? LBL2 NO	YPLG	,X+ LEFT ARROW? LBL3 NO #\$FF -1	CDX <keyflg XX RIGHT ARROW? 1.81.4 NO</keyflg 	FLG	<pre><keyflg any="" i.blz="" key="" pre="" pressed?="" yps<=""></keyflg></pre>		<pre><px <dx="" plus="" pos="" pre="" worm="" x,y="" xtravel<=""></px></pre>	<pre><dy <px="NEW" plus="" pos="" pre="" x,y<="" ytravel=""></dy></pre>	XARRAY, PCR <hp< td=""><td>WX(HP) , X = PX</td><td>RAY, P</td><td>X = X X</td><td>(EL 1F HP>=EL 7.81.5</td><td>THEN HP=0</td><td>OR SCORE*</td><td><pre><px getpos<="" pre="" worm="" x,y=""></px></pre></td><td>,X FROM SCREEN #\$80 BACKGROUND COLOR?</td><td></td><td></td></hp<>	WX(HP) , X = PX	RAY, P	X = X X	(EL 1F HP>=EL 7.81.5	THEN HP=0	OR SCORE*	<pre><px getpos<="" pre="" worm="" x,y=""></px></pre>	,X FROM SCREEN #\$80 BACKGROUND COLOR?		
- Eds.	CMPA LBEQ	at a	ď		ď	INC						₩	ABX STA	~		CMPB	B	FOR CRASH	LDD		BEQ	
1	00670	00720 00720 00730	00750 00760 LBL1 00770		00810 LBL2 00820 00830	00850 00860 LBL3	008800	00910 LBL4	00930	00950 LBLZ 00960	00970	00000	01010	01040	01060	01080	01100 01110 LBL5	01120 01130 *TEST	01140 01150 01160	01170	01190	
	03 7 035D	0 8 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	10 80 06	01 10	80 06 FF	08 10 84 08	03	10	03	05		8D 037F 09	84	8D 0441	84	07	60		05		14 F0	
	304B 81 304D 1027				306A A1 306C 26 306E C6		3078 C6 307A D7 307C 0C						3094 3A 3095 A7		309E A7						30B1 27 30B3 84	
	\$300\$	ппппппппппппппппппппппппппппппппппппппп	.aaa		0 d d .	1110	1 4 C የ የ በ ከ በ ከ በ በ በ በ በ በ በ በ በ በ በ በ በ በ	E-I XI	SDELAY TIME FOR 1/2 CYCLE	3YT	-1,Y WAIT FOR SLOOP1 1/2 CYCLE	ZERO TO D/	<pre><sdelay -1,="" 1="" 2="" <="" cioce="" cycle="" for="" pre="" time="" y=""></sdelay></pre>		SOUND NO YES	LOOP ****	NUMBER OF	NDBYT TURN OFF SOUND	<pre><dx <ox="" case="" direction="" for<="" in="" keypress="" no="" pre="" prep="" save="" worm="" x,y=""></dx></pre>	NEW T	<pre><keyflg \$alcl="" flag="0" pre="" rollover="" set="" table<=""></keyflg></pre>	
	ORG	RMB RMB RMB				G RMB RMB RMB] F-4	LBRA	LDY			CLRA	LDY 2 LEAY	DECB	RTS	MAIN	LDB BSR		LDD STD CLRA	CLRB	STA	
	00130	00150 00160 BITSE'T 00170 OX 00180 OY 00190 DX				00310 KEYFLG 00320 CS 00330 SCOTBL		00370 00380 START		00410	00430 SLOOP1 00440	00450	00470 00480 SLOOP2	00500	00520	00540 ****	00560 MLOOP 00570	00580 00590 **CHECK	00600 00610 00620	00630	00650	
	3000	3000 3001 3002 3003	3005 3006 3007	3008 3009 300A	300B 300D	300F 3011 3011	3014 3018 00F0	301A 16 0230	109E	96 B7	31 26	4F B7 F	302D 109E 0B 3030 31 3F	2 A C			3038 D6 0D 303A 8D E1	0 F	303E DC 03 3040 DD 01 3042 4F		3046 97 10 3048 BD AIC1	
															-							

GOLDLABELTM

BLANK CASSETTES



PREMIUM 5 SCREW SHELL
COMPUTER QUALITY
SATISFACTION GUARANTEED
MADE IN U.S.A.
SCHOOL/CLUB DISCOUNTS

IF YOU ARE SERIOUS ABOUT SAVING PROGRAMS AND DATA ON TAPE, THEN "GO FOR THE GOLD"

	\$ 16.00 + \$ 3.50 shipping		\$ 23.50 + \$ 3.50 shipping
C 10	C-10	C-30	C-30
1 dozen	2 dozen	1 dozen	2 dozen

INDIVIDUAL CASSETTE STORAGE BOXES (SOLD ONLY WITH CASSETTES) \$2.40 PER DOZEN

CASSETTE CADDY



HOLDS 12 CASSETTES
HINGED TOP
STACKABLE
EDGE LABELS INCLUDED

\$ 3.95 + \$ 2.00 shipping 2 for \$7.00 + \$ 2.50 shipping FREE SHIPPING WHEN PURCHASED WITH CASSETTES

BRANTEX, INC.

COLOR SOFTWARE SERVICES DIV. P. O. Box 1708 Greenville, Texas 75401

BHANTELY

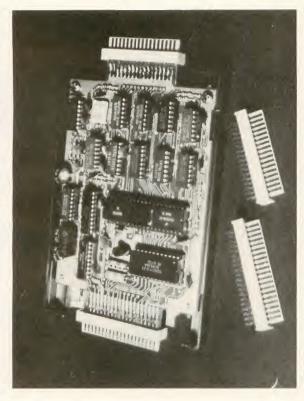
TELEPHONE ORDERS (214) 454-3674 COD/VISA/MASTERCARD

Texas residents add 5% tax Foreign orders add \$2 per order QUANTITY DISCOUNTS AVAILABLE

ATTENTION DEALERS: WE OFFER THE BEST DEALER PLANS AVAILABLE

ATTENTION DISK USERS

ARE YOU TIRED OF I/O ERRORS AND LOST DIRECTORY FAILURES



GOLD EDGE CONNECTORS

When these edge connectors are attached to the Color Computer/System 100 Disk controllers, the dreaded I/O error and lost directory failures may be virtually eliminated. These problems can be caused by oxidation of the tinned connectors on the disk controller, which can cause a poor electrical contact between the disk controller, which can cause a poor electrical contact between the disk controller and the computer. The installation of these connectors DOES REQUIRE SOLDERING. THESE GOLD CONNECTORS ARE SOLDERED DIRECTLY TO THE EDGE CONNECTORS OF THE DISK CONTROLLER. INSTALLATION OF THESE CONNECTORS MAY VOID THE WARRANTY ON THE DISK CONTROLLER.

KIT INCLUDES TWO CONNECTORS AND COMPLETE INSTRUCTIONS FOR EASY INSTALLATION.

PRICE: \$17.95 + \$1.00 shipping (Installation not included)

★ ASK YOUR DEALER ABOUT THEIR INSTALLATION SERVICES ★

CUSTOM INSTALLATION (includes connectors) \$ 35.95 + \$ 4.00 return shipping INSTALLATION AND UPS 2nd DAY SERVICE WITHIN 5 DAYS OF RECEIPT OF DISK CONTROLLER

	Q Z
	BYTE FROM SCREEN GET COLOR INFO MOVE HIGH-ORDER NYBBLE TO LOW-ORDER NYBBLE ADD WORDER NYBBLE ADD TO SCORE FULL IT UP MEDI IT UP FROM SCREEN WORM LONGER BY 1 IF 4 OR MORE POINTS IF 6 OR 7 POINTS MAX WORM LENGTH HOLD AT 200 IT ARKE HIGHER SOUND NEW COLOR HERE WORM TO SCREEN WOYD PAST LEFT BORDER? YES, TRY AGAIN RESTORE YPOS SAUE YPOS SEE WHERE IT'S GOING FROM SCREEN ANYTHING THERE? YES, TRY AGAIN BEATEN COLOR TO NEW LOCATION
	*** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** *** *** *** *** *** *** *** *** *** *** ** *** *** **
	LDB STB LDB ANDB LSRB LSRB LSRB LSRB LSRB LSRB LSRB LSR
	01780 SCORE 01800 01810 01810 01820 01820 01820 01840 01850 01980 01990
	11
	31113 E6 31115 D7 31115 D7 31116 54 31116 54 3116 54
	#WC IS,OR WAS, WORM HERE? LBLB XES SCORE NO, MUST BE PELLET XENTED NO, MUST BE PELLET CRASH LBLD NO #WC EBITSET BWORM THERE NOW? LBLD NO #WC CREED AD WORM TO SCREEN BYTE XARRAY,PCR TAIL**** XARRAY,PCR TP=TP+1 CEL LBL12 THEN TP=0 TYP WX(TP) XARRAY,PCR TP=TP+1 CEL LBL12 THEN TP=0 TYP WX(TP) XARRAY,PCR TP=TP+1 CEL LBL12 THEN TP=0 TH
	CMPA BEG BERA BERA LBLB BERA LBLG LDA LBLG LDA LBLC CDA LBLS TRNOFF LEAX ABX LDA LEAX ABX LDA LEAX ABX LDA LEAX ABX LDB LBC COMA ANDA STA STA ABX LDB LBC COMA ANDA STA BNE
	01210 01220 01230 01230 01240 01250 01250 01270 01280 01280 01280 01280 01280 01280 01280 01280 01280 01330 01330 01330 01330 01330 01330 01340 01330 01340 01340 01350 01480 01480 01480 01480 01550 01650 01550 01550 01550 01550 01560 01570 01580
ge 52	F0 10 110 110 110 110 110 110 11
from page 52	30.85 81 30.85 81 30.85 81 30.89 80 30.89 80 30.89 80 30.81 95 30.81 95 30.80 94 30.80 94 30.80 94 30.80 94 30.80 96 30.80



ANNOUNCING The VIP Library™ With a Terrific Sale!

Nelson Software Systems is now Softlaw Corporation, under new management. Our Super "Color" Library programs have also undergone a name change. All programs are the same unbeatable Super "Color" Library programs you've heard so much about, but with new VIP names. To introduce our VIP Library we are having a special sale on the following pages. Our low prices for such high quality can't be beat so get started today!

'Diamonds in the mud puddle of Color Computer software!'

The Library Concept

State of the Art, Quality, Integrity, Compatibility and Affordability. Five things good software must possess. Five things that epitomize the VIP Library. Each program is the diamond of its class, true excellence. These programs are first in features, first in power, first in memory, and all are affordably priced.

State Of The Art

All Library programs are written in machine code specifically for the Color Computer, to work without the interference of a separate operating system such as FLEX. From this comes speed and more workspace for you. Library programs work perfectly with every Color Computer, from 16 to 64K. The most advanced hardware and software techniques are used to place programs in rompak cartridges for instant loading and total workspace with any Color Computer.

Perfection With 16, 32 or 64K

The programs do not depend on BASIC, and so allow total compatibility and workspace with any size Color Computer, even 64K. Unlike other programs for the Color Computer which are said to be 64K compatible, VIP Library™ programs are not limited to between 24 and 30K of workspace in 64K. Library programs have Memory Sense with BANK SWITCHING to fully use all 64K, thus giving an astounding 61K of workspace with the rompak cartridge, and up to 51K with a disk version!

Lowercase Displays

State-of-the-Art graphics allow instant use of four display colors, and eight lowercase displays featuring descending lowercase letters. You can select from 51, 64 or 85 columns by 21 or 24 lines per screen, with wide or narrow characters in the 64 display. These screens provide a pleasant and relaxing way to perform your tasks, with as much text on the

"... PICTURE getting your instantaneous investment report over the phone, using it in your spreadsheet calculation, generating a report, and writing a memo including that report and data from your database with your word processor, and all this with VIP LibraryTM programs ..."

screen as is possible. Each program is easy to learn and a joy to use. We take pride in the stringent testing done to make these programs perform flawlessly. Every feature, every convenience, sleek, simple and elegant.

Total Compatibility

All **Library** programs are compatible. Transfer and use of files between programs is easy and carefree. What's better, when you have learned one program the others will come easy. And every program is the best of its kind available.

The Library Programs

For your writing needs is the VIP Writer™, and its spelling checker, the VIP Speller™. For financial planning and mathematical calculations you can use the VIP Calc™. To manage your information and send multiple mailings there is the VIP Database™. For sending all these files to and from home or the office and for talking to your friends you can have the VIP Terminal™. Finally, to fix disks to keep all your Library files in good repair we offer the VIP Disk-ZAP™.

Mini Disk Operating System

The Disk versions each have a Mini Disk Operating System which will masterfully handle from 1 to 4 drives. It offers smooth operation for such features as the ability to read a directory, display free space on the disk, kill files, save and automatically verify files, and load, rename and append files. **Library** programs simply do not have the limitations of BASIC.

Professionalism

The **Library** comes handsomely bound in gold-embossed, padded leatherette binders to grace your work area with the professionalism it deserves. Welcome the **VIP Library** into your home and office.

A description of each of the **Library** programs, with the special sale price, is contained in the following pages. Please indulge!

@1983 by Softlaw Corporation

VIP Writer™

By Tim Nelson

RATED TOPS IN RAINBOW, HOT COCO, COLOR COMPUTER MAGAZINE AND BASIC COMPUTING The Official Dragon Microcomputer Word Processort

The most powerful and easy-to-use word processor is available in the showpiece and workhorse of the Library: The VIP Writer™. Because of its undisputed superiority over all Color Computer word processors, it was selected by Dragon Data Ltd. of England to be the Official Word Processor for its line of Dragon microcomputers.

The result of two years of research, the VIP Writer™ offers every feature you could desire from a word processor. It is the most powerful, fastest, most dependable and most versatile. With the display, workspace and compatibility features built into the Library the

Writer is also the most usable.

". . . Nearly every feature and option possible to implement on the Color Computer. The design of the program is excellent; the programming is flawless . . . Features for the professional, yet it is easy enough for newcomers to master . . . Certainly one of the best word processors available for any computer . . ." October 1983 "Rainbow"

The Writer will work with you and your printer to do things you always wanted to do. Every feature of your printer can be put to use, every character set, every graphics capability at any baud rate, EVEN PROPORTIONAL SPACING. All this with simplicity and elegance.

Although all versions feature tape save and load, the disk version provides the Mini Disk Operating System common to the whole Library, plus disk file linking for continous printing.

Professional features of particular note:

■ Memory-Sense with BANK SWITCHING to fully utilize 64K, giving not just 24 or 30K, but up to 61K of workspace with the rompak version and 50K with the disk version.

■ TRUE FORMAT WINDOW to EXACTLY replicate the printed page ON THE SCREEN BEFORE PRINTING, showing centered line headers, FOOTNOTES, page breaks, page numbers, & margins in line lengths of up to 240 characters. It makes HYPHENATION a snap.

• A TRUE EDITING WINDOW in all 9 display modes for those extra

wide reports and graphs (up to 240 columns!).

■ FREEDOM to imbed any number of PRINTER CONTROL CODES anywhere, EVEN WITHIN JUSTIFIED TEXT.

■ Full 4-way cursor control, sophisticated edit commands, the ability to edit any BASIC program or ASCII textfile, SEVEN DELETE FUNCTIONS, LINE INSERT, LOCATE AND CHANGE, wild card locate, up to TEN SIMULTANEOUS block manipulations, word wrap around, programmable tabs, display memory used and left, non-breakable space, and headers, footers and FOOTNOTES.

The ability to control ANY PRINTER, using dynamic text formatting

with 27 comprehensive format parameters.

 Automatic justification, automatic pagination, automatic centering, automatic flush right, underlining, superscripts, subscripts, pause

print, single-sheet pause, and print comments.

■ Type-ahead, typamatic key repeat and key beep for the pros, ERROR DETECTION and UNDO MISTAKE features, 3 PROGRAM-MABLE functions, auto phrase insert, column creation, an instant HELP TABLE, and a 110 page, fully indexed tutorial.

16K ROMPAK \$59.95

32K DISK \$59.95

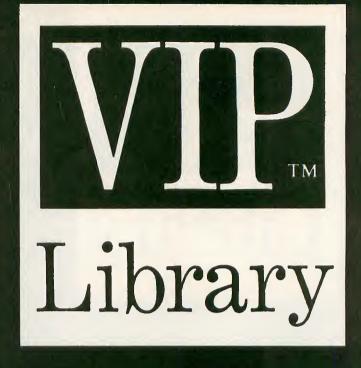
†Sold as the Dragon Writer™ ONLY by Dragon Data Ltd. and its distributors.

VIP Speller™

(Formerly Super "Color" Speller) THE WRITER'S ESSENTIAL COMPANION

Spelling checkers are an invaluable aid to every writer. Habitual misspellings and typos can be found without the eyestrain, boredom and fatigue associated with endless proofreading. The VIP Speller™ is a fast, machine-code proofreading program to correct any VIP Library™ or other ASCII file. It automatically proofreads your documents against a 20,000 word stock dictionary, plus your own customized dictionary and corrects typos or marks them for special attention.

> **DISK ONLY \$49.95** Lowercase displays not available with this program.



(Formerly Super "Color" Calc) TRUE VISICALCT POWER! By Kevin Herrboldt

- * UP TO 5 TIMES THE SCREEN DISPLAY AREA OF OTHER SPREADSHEETS!
- STATE OF THE ART LOWERCASE DISPLAYS
 MEMORY SENSE WITH BANK SWITCHING FOR UP TO 61K in 64K!

ROMPAK CARTRIDGE FOR TOTAL WORKSPACE

- **EXCLUSIVE VIDEO DISPLAY WINDOWS EVEN UP TO 16!**
- USER-DEFINABLE WORKSHEET UP TO 512 COLUMNS BY **1024 ROWS**
- WORKS WITH ANY PRINTER, EVEN LETTER QUALITY!
- LOCATE COMMAND TO FIND SPECIFIC NUMBERS, LABELS OR **FORMULAS**
- 16 DIGIT PRECISION FOR THOSE SPECIAL SCIENTIFIC USES
- ALMOST UNLIMITED PROGRAMMABLE FUNCTIONS

VIP Calc™ is truly the finest and easily the most powerful electronic worksheet and financial modeling program available for the Color Computer, from 16 to 64K. Now every Color Computer owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some, WITH USABLE DISPLAYS. Use Visicalc templates with VIP Calc™!

There's nothing left out of VIP Calc™. Every feature you've come to rely on with VisiCalc™ is there, and then some. You get up to 5 TIMES the screen display area of other spreadsheets for the Color Computer and Memory-Sense with **BANK SWITCHING** to give not just 24, or 30, but UP TO 61K OF WORKSPACE IN 64K!!! This display and memory allow you the FULL SIZE, USABLE WORK-SHEETS you require. You also get: User definable worksheet size, up to 512 columns by 1024 rows! * get: User definable worksheet size, up to 512 columns by 1024 lows:
Up to SIXTEEN VIDEO DISPLAY WINDOWS to compare and contrast
results of changes * 16 DIGIT PRECISION * Sine, Cosine and other
trigonometric functions, Averaging, Exponents, Algebraic functions,
and BASE 2, 8, 10 or 16 entry * Multi-layered Column and Row,
Ascending and Descending SORTS for comparison of results * LOCATE
FORMULAS OR TITLES IN CELLS * Easy entry, replication and block moving of frames * Global or Local column width control up to 81 characters width per cell * Create titles of up to 255 characters per cell * Limitless programmable functions * Typamatic Key Repeat * Key Beep * Typeahead * Print up to 255 cloumn worksheet * Prints at any baud rate from 110 to 9600 * Print formats savable along with worksheet * Enter PRINTER CONTROL CODES for customized printing with letter and the matrix printer * Combine apparent to the VIP. quality or dot matrix printer * Combine spreadsheet tables with VIP Writer™ documents to create ledgers, projections, statistical and financial reports and budgets.

Both versions feature Tape save and load, but the disk version also has the Mini Disk Operating System of the entire Library.

16K ROMPAK \$59.95

32K DISK \$59.95

NEW SALE PRICES!

- Nine Display Formats: 32 by 16 51, 64, 85 by 21 or 24
- True Lowercase & Descenders
- Four Different Display Colors
- 16, 32 & 64K Compatible
- Memory Sense Bank Switching
- Up to 51K Disk, 61K Rompak
- Mini Disk Operating System
- Compatible With All Printers

A SPECIAL OFFER ON THE WHOLE LIBRARY —

The entire Library, all six great disk programs, can be purchased for only \$300!

THE FINEST TERMINAL PROGRAM ANYWHERE!

By Dan Nelson

From your home or office you can join the communication revolution. The **VIP Terminal** opens the world to you. You can monitor your investments with the Dow Jones Information Service, or broaden your horizons with The Source or Compuserve, bulletin boards, other computers, even the mainframe at work

Picture getting your instantaneous investment report, incorporating it in your spreadsheet calculation, generating a report, and writing a memo incorporating that report and data from your database, all with Library programs. Then you can transmit the report to work, or wherever, long distance. The VIP Terminal™ will become the hub of your Library.

FEATURES: Memory-Sense with BANK SWITCHING for full use of workspace, from 16 to 64K * Selectively print data at baud rates from 110 to 9600 * Full 128 character ASCII keyboard * Automatic graphic mode * Word mode (word wrap) for unbroken words * Send and receive Library files, Machine Lanuage & BASIC programs * Set communications baud rate from 110 to 9600, Duplex: Half/Full/Echo, Word length: 7 or 8, Parity: Odd/Even or None, Stop Bits: 1-9 * Local linefeeds to screen * Save and load ASCII files, Machine Code & BASIC programs * Lowercase masking * 10 Keystroke Multiplier (MACRO) buffers to perform repetitive pre-entry log-on tasks and send short messages * Programmable prompt or delay for send next line * Selectable character trapping * Send up to ten short messages (KSMs), each up to 255 characters long, automatically, to save money when calling long distance.

All versions allow tape load and save of files and KSMs, but the disk version also has the Mini Disk Operating System common to the

16K ROMPAK \$49.95

16K DISK \$49.95

Disk version requires 32K for lowercase displays.



9072 Lyndale Avenue So. 612/881-2777

TRS-80 is a trademark of Tandy Corp. VisiCalc is a trademark of VisiCorp.

AUTHOR'S SUBMISSIONS ARE ENCOURAGED.

VIP Database

(Formerly Super "Color" Database)
INCLUDES MAIL MERGE CAPABILITIES TOO! By Tim Nelson

This high speed MACHINE LANGUAGE program fills all your information management needs, be they for your business or home. And it does so better than any other database program for the Color Computer, featuring machine code, lowercase screens and mailmerge capabilities. Inventory, accounts, mailing lists, family histories, you name it, the VIP Database™ will keep track of all your data, and it will sort and merge VIP Writer™ files.

The VIP Database™ features the Library Memory Sense with BANK SWITCHING and selectable lowercase displays for maximum utility. It will handle as many records as fit on your disk or disks. It is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design, each divided into up to 255 fields. Each field will hold up to 255 characters. All files are fully indexed for speed and efficiency. Full sort of records is provided for easy listing of names, figures, addresses, etc., in ascending or descending alphabetic or numeric order. You may also combine files, sort and print mailing lists, print "boiler plate" documents, automatically insert text in standardized forms, address envelopes - the list is endless. The math package even performs arithmetic operations and updates other fields. Create files compatible with the VIP Writer and VIP Terminal. Up to five different print formats are available, and control codes may be imbedded for use with all printers.

As with all other Library programs, the Database features the powerful Mini Disk Operating System.

32K DISK \$59.95

RAVED ABOUT IN THE APRIL 1983 "RAINBOW!"

By Tim Nelson

Your database file disk, form letter disk, or BASIC program disk goes bad. An I/O error stops loading, or even backing up of the disk. Weeks, even months of work sit on the disk, irretrievable. Now catastrophic disk errors are repairable, quickly and with confidence, using the VIP Disk-ZAP™. It is the ultimate repair utility for simple and quick repair of all disk errors. Designed with the non-programmer in mind, the VIP Disk-ZAP™ will let you retrieve all types of bashed files, BASIC and Machine Code programs.

This high-speed machine code disk utility has a special dual cursor screen display to look at the data on your disk. You are able to: Verify or modify disk sectors at will * Type right onto the disk to change unwanted program names or prompts * Send sector contents to the printer * Search the entire disk for any grouping of characters * Copy sectors * Backup tracks or entire disks * Repair directory tracks and smashed disks * Full prompting to help you every step of the way * 50plus page Operators Manual which teaches disk structure and repair.

16K DISK \$49.95
Lowercase displays not available with this program.



For Orders ONLY — Call Toll Free —



1-800-328-273

Order Status and Software Support call (612) 881-2777

Available at Dealers everywhere. If your Dealer is out of stock ORDER DIRECT!

In Canada distributed by Kelly Software Distributing, LTD. MAIL ORDERS: \$3.00 U.S. Shipping (\$5.00 CANADA; \$10.00 OVER-

SEAS). Personal checks allow 3 weeks.

All Disk Programs are also available on 3" Diskettes for the Amdek Color AMDISK-III Micro-Floppy Disk System for an additional \$3.00 each. @1983 by Softlaw Corporation

Circle No. 29 on Reader Service Card

Go for the "MAX"

Panamax
Surge Suppressors
provide the fastest
response time and
highest energy
dissipation available
to assure you the
maximum protection
against over voltage
"Spikes and glitches".
Priced from \$59.00



PANAMAX

Toll Free 1-800-472-5555 In California call 415-472-5547 150 Mitchell Boulevard, San Rafael, CA 94903

See us at Chicago and Washington, D.C.—C.S.E.

back issues of The Color Computer Magazine for \$5 each (includes shipping & handling). All are available except May '83.

solution your valuable copies of The Color Computer Magazine dust - free in their own

handsome, royal blue and silver binders. \$7.95 each plus \$1.50 shipping &

handling. Send coupon to

The Color Computer Magazine

BACK ISSUES/BINDERS
Highland Mill, Camden, ME 04843

Please send me the following back issues

Please send me the following back issues:
() () () () () () () () () ()
at \$5.00 each, and Binders to keep them in @ \$7.95 each plus \$1.50 S&H.
Total amount \$ Check or M.O. enclosed
☐ MasterCard ☐ VISA Exp
Name
Address
City Chata 7tm

from page 54	54									,		
			OM NUMBER	**RANDOM NUMBER GENERATOR**	DR**	31E6 8D	53	02960	BSR	SETD		
							FCFC	02970	rDD	# \$ FCFC	TOP BORDER	
3170 34		02370 RANDOM	PSHS	BrX		31EB 8E	0400	02980	LDX	#\$400	WHERE IT GOES	
	8D 0018	02380	LEAX	RNDNOS, PCR	PCR		0020	02990	LDY	#32	HOW LONG I'T IS	
3176 C6	03	02390	LDB	#3			47	03000	BSR	SETD		
3178 4F		02400	CLRA				F3F3	03010	TDD	#\$F3F3	LOWER BORDER	
	85	02410	LDA	B,X			0020	03020	LDY	#32	HOW LONG I'T IS	
		02420	DECB				0500	03030	TDX	#\$5C0	WHERE I'T GOES	
	85	02430 RLOOP1	ADCA	B,X		31FE 8D	38	03040	BSR	SETD		
	85	02440	STA	B,X					*VERTICAL BARS*			
		02450	DECB			3200 86	FA	03060	LDA	#SFA	LEF'T BORDER	
	F9	02460	BPL	RLOOP1		0	0 E	03070	LDB	#14	HOW LONG I'L IS	
3183 C6	03		LDB	#3				03080	LDX	#\$420	WHERE TO START	
	82	02480 RLOOP2	INC	B,X			39	03090	BSR	SETA		
31.87 26	03	02490	BNE	RNDEND		3209 86		03100	LDA	#\$#5	RIGHT BORDER	
3189 5A		02500	DECB				[t _i	03110	TDX	#\$43F	WHERE IT GOES	
	F9	02510	BPL	RL00P2			0 8	03120	LDB	#14	HOW LONG I'T IS	
318C 35	94		PULS	B,X,PC				03130	BSR	SETA		
318E		02530 RNDNOS	RMB	4		3212 86		03140	LDA	# \$FE	UPPER LEFT CORNER	
							0400	03150	STA	\$400		
		LOd***	NUMBERS	ON SCREEN***	***	3217 86		03160	LDA	#\$FD	UPPER RIGHT CORNER	
						3219 B7	041F		STA	\$41F		
		02570 HEXDEC	PSHS	×	SAVE IT				*MESSAGES*			4.
	8D FE7F	02580	LEAX	3+RESULT, PCR	I, PCR			03190	LDU	#\$5E1	ADDRESS ON SCREEN	
3198 GF	84	02590	CLR	×,	CLEAR OUT ARRAY		8D 0167	03200	LEAX	SCMES, PCR	R	
319A 6F	82	02600	CLR	×- '	*		0A	03210	BSR	PUTMES	SCORE=	1
	82	02610	CLR	X-,			05 EF	03220	LDU	# \$5 EF	SCREEN ADDRESS	
319E 6F	82	02620	CLR	x-,		3228 30	8D 0166	03230	LEAX	CLMES, PC	CLMES, PCR	
	84	02630 LBLMS	INC	×	ADD 1 TO THOUSANDS		01	03240	BSR	PUTMES	CRASHES LEFT	
31A2 83	03E8	02640	SUBD	#1000		322E 39		03250	RTS			
	L 1	00070	ארב	LBLMS				03260				

Elite-Calc Total

NOW... The worksheet calculator program you've been waiting for is waiting to work for you. ELITE-CALC' is a powerful, full featured worksheet calculator designed especially for the Color Com-puter. Answer "what it" questions, prepare reports,

maintain records and perform other tasks that, until now, required sophisticated business computers. ELITE-CALC is a serious tool for those who want to do more than play games with their Color Computer.

Features include:

RELOCATABLE

BITSET, PCR X,D SET UP

LEAX

INIL

FDAF

3D 10 8B

RETURN

DIGITS?

10

INI'TIALIZE

STD LEAY BNE RTS ORA STA LEAX DECB BNE

03310 03320 03330 03340 03340 03340 03340 03440 03440 03440 03440 03440 03450 03450 03450 03450 03450 03450 03450 03450

ASCII

START

TO

BACK MAKE

SCOLUP

ADJUST

20

39 39 39 39 39

3233B 3233B 32441 32442 32444 32444 32444 3244

81 3E FA

COUNTER ONES

TOO FAR ADJUST C

1000 1000 1100

TO.

Н

ADD

002660 002670 002690 002710 002710 002730 002750 002750 002750 002780 002780 002780 002780 002780 002780 002780 002780 002780 002780 002780 002780 002880 002880

03 E8 80 64 80 00 64 80 000 64 80 000 00 80 000 01 100 03 C5

DIRECT

X,D A,DP

FROM TIMER

RNDNOS, PCR 2+RNDNOS, PCR

0112 8D FF32 8D FF30

ED ED

3255 3258 325C

MEMORY

START

SCREEN AMT OF

\$8080 \$400 \$200

CDX

31DC 31DF 31E2

BORDER

m

A AND

LENGTH OF MESSAGE GET A LETTER MAKE LOWER-CASE FUT ON SCREEN LAST LETTER? NOT YET

PUTMES MES LP

0 0 0 0 0 0 0 0 0

TOO FAR, ADJUST ADJUST AND MOVE UP ADD 1 TO HUNDREDS

322F 3231 3233 3235 3237 3238 3238

TOO FAR, ADJUST ADJUST COUNTER ADD 1 TO TENS

(ESLP

- Single character commands
 Help Displays
 Enter text or formulas to 255
 characters long
 Repeat lext entries
 255 maximum rows
 255 maximum columns
 Available memory always there
- Available memory always displayed Rapid Entry modes for lext and CHANGEABLE BAUD RATES
- Selectable Automatic Cursor movement
- Insert, Delete, Move entire rows or columns
- Insert, Detete, move entire time occurrent columns
 Replicate one cell to til a row or columns with selectable formula adjustment
 All machine language for speed
 Extended BASIC required for ROM routine calls
 Automatic memory size detection for 16K, 32K or 64K

 20K bytes, storage available in 32K systems
 BASIC style formulas.

- Trig Functions SIN, COS, TAN,

"Elite•Calc is a great spreadsheet program!" Stuart Hawkinson, Rainbow

Elite Software

EASY TO USE

- . INDIVIDUAL CELL FORMULAS
- . COPY BLOCKS OF CELLS
- FULL CELL-EDIT CAPABILITY
- . COMPATIBLE WITH ALL PRINTERS
- . EASY 132 COLUMN PAGE WIDTH
- . GRAPH FORMAT FOR BAR CHARTS
- SORT IN ASCENDING OR DESCENDING ORDER
- . COMPREHENSIVE MANUAL INCLUDED
- NATIONWIDE USER GROUP
- HANDSOME VINYL BINDER

THE BEST FOR ONLY

Specify: Disk or Tape

Shipping from stock NOW

Dealer Inquiries Invited

Add \$2 Postage & Handling PA residents add 6 sales tax



- Log Functions: LOG, EXP, SQR.
 Misc. Functions: INT, FX, ABS, SGN.

- SGN.

 Range Functions: SUM, AVERAGE, COUNT, MIN, MAX, LOOKUP

 Nine digit precision

 Definable constant table

 User definable printer set-up commands

- blowess without washing memory memory memory without washing memory memory without washing memory or cell by cell basis or cell by cell basis or colling to produce the colling of the colling of the colling of the colling or colling

- Full page formatting
 All formats stored with worksheet
 on disk tape?
 All formats stored with worksheet
 on disk tape?
 Some stored with worksheet
 compact sementy form
 Scan disk directores
 Dispussion of the store word
 orderssor input compatibility
 Memory resident code
 repeated disk calls Sample worksheets included

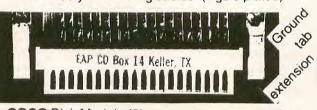
"Truly one of the best programs I have seen." John Steiner, Micro

D • COLOR TEXTSET I • COLOR TEXTSET II • INTER-PARTY PAK • COLOR MONITOR • TREK-16 • WARKINGS • 9T\$ • TAPE COPY and many other ting programs

TRS-80+ MOD I, III, COCO, TI99/4a TIMEX 1000, OSBORNE, others

LD PLUG - 80

Eliminate disk reboots and data loss due to oxidized contacts at the card edge connectors. GOLD PLUG 80 solders to the board edge connector. Use your existing cables. (if gold plated)



COCO Disk Module (2) Ground tab extensions Disk Drives (all R.S.) Gold Disk Cable 2 Drive Four Drive Cable

USA shipping \$1.45 Foreign \$7.

new SPECIAL PRICE

INCL \$7.95 29.95 39.95

\$16.95

Don't wait any longer

Can/Mex \$4. **TEXAS 5% TAX**

Available at your favorite dealer or order direct from



E.A.P. CO. P.O. BOX 14



KELLER, TEXAS 76248 (817) 498-4242

MC/VISA

+ trademark Tandy Corp

CoCo POWER

UNLEASH THE POWER IN YOUR CoCo WITH ONE (OR MORE) OF OUR BOARDS

WORD-PAK\$139.95
No longer do you have to sacrifice valuable memory and strained
eyesight to expand the video display of your computer. Just plug
the WORD-PAK* into the ROM port and get a high quality 80
column video display comparable to the high priced terminals.
Software, included with the board, provides terminal functions,
programmable screen formats (for compatibility with other com-
puters), and screen editing capabilities. You can use it with most
of your Basic programs or add the Flex Patch (below) to run all
those Flex programs that require an 80 column display. Available
for cassette or disk based systems (disk systems require the use
of a Y-connector or expansion bus).

FLEX PATCH \$24.95
TEXPROIII (TEXT EDITOR/PROCESSOR) \$79.95
*The WORD-PAK produces a composite video signal and requires
the use of a monitor capable of displaying 80 columns of text.

Connect the C-C BUS to the ROM port and instantly have six software selectable expansion slots. Expand memory beyond 64K, add a parallel port, EPROM programmer, digitizer . . . you name it, and software select the one you want to use without having to turn your computer off to change cartridges. The C-C BUS is compatible with any size system and automatically senses when you are in the 64K mode, preventing any contention problems. The C-C BUS is supplied complete with a built in power supply, con-

buffered Centronics compatible parallel printer port. The board can be supplied with an optional real time clock (\$69.00) or both for \$122.95.

ACCESSORIES	•
Y-CABLE	. \$29.95
S-CABLE	. \$19.95

BARE BOARDS

nection cable, and molded plastic cover.

Save by building your own. We will supply complete documentation including schematics, layout and parts list.

WORD-PAK BB	 	 	 \$17.95
C-C BUS BB	 	 	 \$22.95
P-C PAK			
MEM-PAK	 	 	 \$19.95

MAIL ORDERS:

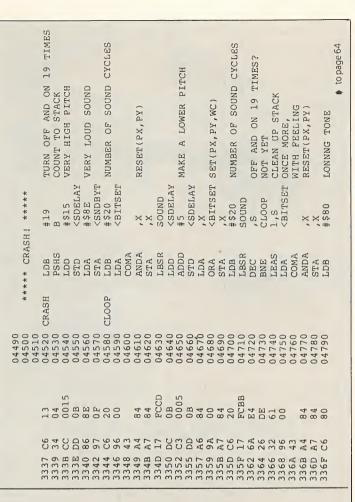
Send check, money order, MASTERCARD/ VISA (include card number, interbank number, expiration date and signature) for total purchase price, plus \$2.50 for shipping and handling (Canadian orders please add \$5.00). New Jersey residents add applicable sales tax.

Prices subject to change without notice.

inc.

P.O. BOX 813 N. Bergen, N.J. 07047 (201) 330-1898

\$5FF PUT CRASHES LEFT \$70 SET (OR RESTORE) SDELAY PITCH FOR SOUND SNDEYT NO SOUND YET \$8F FIRST PELLET COLOR CPELLET 7 COLORS TO DO	MORE PUT A PELLET (PELLET #\$10 NEXT COLOR (PELLET) , S DONE ALL PELLETS? 1 S CTEAN ID STANCE	RAY, P	
STA LDD STD CLR LDA STA LDB	FSHS LBSR LDA ADDA STA DEC BNE	LEAX LEAX LEAU LDD STA STA DECB BNE	STD LDA LEAY BNE DECA BNE
041180 042190 042200 042220 042330 042340	04250 04260 BUGS 04280 04290 04310 043310		04410 04420 04430 WAIT 04440 04460 04460 04480
05 FF 0070 0B 0F 8F 07	0 1 0 8 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	80 00F9 8D 01C2 20CD 80 C0 F9	03 03 3F FC FO FD01
32F3 B7 32F6 CC 32F9 DD 32FB OF 32FD 86 33FF 97 3301 C6	300 B	3321 HC 844	3329 DD 332B 86 332D 31 332F 26 3331 44 3332 16
#\$10 MASK INTERRUPT #\$FF FLAG FOR FIRST GAME <tmpono #="" #\$480<="" 0="" <hstbl="" border="" high="" no="" pcr="" score="" td="" title,="" yet=""><td>#348C SCREEN ADDRESS PUTMES #0 NO SCORE <scotbl #5.4c7="" #5.4c7<="" <cs="" crashes="" no="" pcr="" td="" tmmpmes,=""><td>PUTMES 1-8 SULPRIOR ENTER LEMFO DUTMES '1-8 SULMED LAST TEMPO FIRST IF NO LAST TEMPO BY STAMP STAMP STAMP STAMP STAMP STAMP SCREEN ADDRESS SULMES STAMPONO</td><td>#\$31 MAKE LOWER-CASE ASCII ,U TO SCREEN TTBL,PCR \$Alc1 INTEMP NO KEYPRESS #3 EXIT YES #\$31 TRY TO MAKE 0-7</td></scotbl></td></tmpono>	#348C SCREEN ADDRESS PUTMES #0 NO SCORE <scotbl #5.4c7="" #5.4c7<="" <cs="" crashes="" no="" pcr="" td="" tmmpmes,=""><td>PUTMES 1-8 SULPRIOR ENTER LEMFO DUTMES '1-8 SULMED LAST TEMPO FIRST IF NO LAST TEMPO BY STAMP STAMP STAMP STAMP STAMP STAMP SCREEN ADDRESS SULMES STAMPONO</td><td>#\$31 MAKE LOWER-CASE ASCII ,U TO SCREEN TTBL,PCR \$Alc1 INTEMP NO KEYPRESS #3 EXIT YES #\$31 TRY TO MAKE 0-7</td></scotbl>	PUTMES 1-8 SULPRIOR ENTER LEMFO DUTMES '1-8 SULMED LAST TEMPO FIRST IF NO LAST TEMPO BY STAMP STAMP STAMP STAMP STAMP STAMP SCREEN ADDRESS SULMES STAMPONO	#\$31 MAKE LOWER-CASE ASCII ,U TO SCREEN TTBL,PCR \$Alc1 INTEMP NO KEYPRESS #3 EXIT YES #\$31 TRY TO MAKE 0-7
ORCC LDA STA LDD STD LBSR LBSR	LBSR LBSR NEWGAM LDD STD STA LEAX	LBSR LBSR LDA BMI LEAX LBG LBG LBG LBG	ADDA STA STA INTEMP JSR BEQ CMPA LBEQ SUBA
03570 03580 03590 03600 03620		03720 03730 03740 03750 03760 03780	
10 FF 0E 0000 18 FF6E 8D 0171	FFB7 0000 12 11 8D 0168	FFA6 FFA3 0E 10 10 8D 0168 05A8 FF95	
3260 1A 3262 86 3264 97 3266 CC 3269 DD 326E 30		3286 17 3286 17 3286 17 3286 26 3290 30 3294 CE 3297 17	



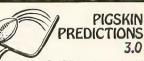
AGAIN		AGAIN																								(A)				
TOO LOW, TRY AGAIN		I, TRY	DURATION	R IT	FESET			OUND	PIA'S			AUDIO	KER													ADDRES	SCORE			
O LOW,					STORE OF		SELECT	6-BIT SOUN	THE			ENABLE AUDIO	SPEAKER				EL=10		6=		TP=0	PX=61	=29			[x]				
TO		TOO	GET	AND			SE	9	H			EN	70				EL		HP=		TP	PX	PY			SC	PUT			
INTEMP	88 ##	INTEMP	A,X	<tempo< td=""><td><tmpono< td=""><td>\$FF01</td><td># \$ 臣 7</td><td>\$FF01</td><td>\$FF03</td><td># \$ E 7</td><td>SFF03</td><td>co #=</td><td>\$FF23</td><td>\$FF23</td><td></td><td>#10</td><td><bl< td=""><td></td><td><hp< td=""><td></td><td><tp< td=""><td>#\$3D1D</td><td><px< td=""><td>BORDER</td><td><scotbl< td=""><td># \$5 至9</td><td>HEXDEC</td><td>#\$35</td><td><cs< td=""><td></td></cs<></td></scotbl<></td></px<></td></tp<></td></hp<></td></bl<></td></tmpono<></td></tempo<>	<tmpono< td=""><td>\$FF01</td><td># \$ 臣 7</td><td>\$FF01</td><td>\$FF03</td><td># \$ E 7</td><td>SFF03</td><td>co #=</td><td>\$FF23</td><td>\$FF23</td><td></td><td>#10</td><td><bl< td=""><td></td><td><hp< td=""><td></td><td><tp< td=""><td>#\$3D1D</td><td><px< td=""><td>BORDER</td><td><scotbl< td=""><td># \$5 至9</td><td>HEXDEC</td><td>#\$35</td><td><cs< td=""><td></td></cs<></td></scotbl<></td></px<></td></tp<></td></hp<></td></bl<></td></tmpono<>	\$FF01	# \$ 臣 7	\$FF01	\$FF03	# \$ E 7	SFF03	co #=	\$FF23	\$FF23		#10	<bl< td=""><td></td><td><hp< td=""><td></td><td><tp< td=""><td>#\$3D1D</td><td><px< td=""><td>BORDER</td><td><scotbl< td=""><td># \$5 至9</td><td>HEXDEC</td><td>#\$35</td><td><cs< td=""><td></td></cs<></td></scotbl<></td></px<></td></tp<></td></hp<></td></bl<>		<hp< td=""><td></td><td><tp< td=""><td>#\$3D1D</td><td><px< td=""><td>BORDER</td><td><scotbl< td=""><td># \$5 至9</td><td>HEXDEC</td><td>#\$35</td><td><cs< td=""><td></td></cs<></td></scotbl<></td></px<></td></tp<></td></hp<>		<tp< td=""><td>#\$3D1D</td><td><px< td=""><td>BORDER</td><td><scotbl< td=""><td># \$5 至9</td><td>HEXDEC</td><td>#\$35</td><td><cs< td=""><td></td></cs<></td></scotbl<></td></px<></td></tp<>	#\$3D1D	<px< td=""><td>BORDER</td><td><scotbl< td=""><td># \$5 至9</td><td>HEXDEC</td><td>#\$35</td><td><cs< td=""><td></td></cs<></td></scotbl<></td></px<>	BORDER	<scotbl< td=""><td># \$5 至9</td><td>HEXDEC</td><td>#\$35</td><td><cs< td=""><td></td></cs<></td></scotbl<>	# \$5 至9	HEXDEC	#\$35	<cs< td=""><td></td></cs<>	
BCS	CMPA	IS	LDB	B	A.	J.A	ANDA	STA)A	IDA	A.	LDA	ORA	A.		LDA	STA	DECA	STA	,RB	B	LDD	Q.	SSR	OC	LDU	LBSR	LDA	SUBA	
BC	Ű	BF	H	SI	SI	L	AN	SI	I	AN	S	I	Ö	S		I	ST	DE	SI	CI	SI	Ľ	ST	L	17	I	LE	占	SI	
																PHASE														
03880	03880	03900	03910	03920	03930	03940	03950	03960	03970	03980	03990	04000	04010	04020	04030	04040	04050	04060	04070	04080	04090	04100	04110	04120	04130	04140	04150	04160	04170	
F	0.8	BD	98	00	0 E	FF01	77	FF01	FF03	F7	FF03	08	FF23	FF23		0 A	07		60		0 A	3D1D	05	FEF5	12	05 E9	FEA3	35	11	
							84									86												86		
32B1	32B3	32B5	32B7	32B9	32BB	32BD	32C0	32C2	32C5	32C8	32CA	32CD	32CF	32D2		32D5	32D7	32D9	32DA	32DC	32DD	32DF	32 E2	32E4	32E7	32E9	32 EC	32 EF	32F1	



RAINBOW WRITER ENHANCER

troducing the ultimate in hi-res graphics text display Allows your color computer to write text on any graphics screen in Rainbow colors. 16K Extended Basic required. 12 sizes to 64 × 24. See accompanying ad for details. \$29.95 Cass - \$32.95 Disk

- User definable 224 character set featuring true lowercase with descenders, improved cursor, stashed zero. Greek math symbols, lunar landers, stick ligures, tanks, cars, planes, card suits, etc.
- Works in all PMODES. Four-color artifacted characters in PMODE 4 (highest resolution)!
- Pre-loader allows optimum loading in 16K, 32K or 64K machines. The 64K selection automatically transfers all ROM (including cartridge) to RAM. Uses 4-5K of memory.
- ML extension of BASIC completely inferfaced and transparent incorporating direct conversion of all keys and commands including PRINT @.
- Use all day for hi-density screen displays, graph labels and listings, or incorporate into your own BASIC or ML games, word processors, etc.
- Includes demo program, tape/disk conversion instructions, character generator program, and operators manual.
- arge colored letters for children or video recorders irect from keyboard or program.



Predicts all games for remainder of season each week

Calculates projected won loss records for all weeks. Maintains home field advantage rating as well as power rating for each team for accurate predictions.

Allows user schedule entry 1983 sch ncluded free—ready to run.

-Tracks computer's accuracy by team and week

32K enhanced version features dazzling Rambow-Writer screen displays. 16K abridged version included free. 16:32K Extended Basic required. 2 tabe cassette \$29.95; 32 Disk \$32.95. Pre-





Color Computer Flex* OS-9† Users Move up to

Language Compiler

*OS-9 is a trademark of Microware, Inc. FLEX is a trademark of Technical Systems Consultants, Inc.

DO YOU WAN'T faster running programs (over 100 times faster than BASIC)? A high level language that is also a low level language? A compiler that runs in less than 32K? Assembly language output? Position independent code? Extensive library functions in source assembly code? Periodic newsletters with new library functions? An aid in learning assembly language? Liberal version updates?

C is the language of the eighties; accepted by IBM and Bell Labs for system development: a compact, highly versatile, easy to use to build games, and

easy to use language, excellent to use to build games, applications, utilities, operating systems, etc.

DUGGER'S GROWING SYSTEMS with over 21 years of ex perience in computing was first on the market with a 6809 C compiler. The compiler has been extensively tested, revised, and proven.

DUGGER'S GROWING SYSTEMS C is a growing subset of the standard C. Version 1 contains all the necessary C com-mands (while, if, if else, int, char, etc.). Version 2 contains additional features (float, long, for, goto, etc.).

AN EXTENSIVE LIBRARY in assembly language source is AN EAST-RANGE EIGHT AND ASSEMBLY All BARGAGE SOURCES provided (char, I/O, formatted print, filehandling, string manipulating, etc.) Color Computer version also has additional functions which use the BASIC ROM functions (cls. polcat, floating point, etc.).

ORDER NOW (new low prices) Color Computer C Compiler Version 1.2 (disk version) \$49.95 120.00 Flex C Compiler Version 2.3 OS-9 C Compiler Version 1.2 95.00 C Programming Language by Kernighan & Ritchie (a must) 19.95 Computerware disk assembler 49.95 Computerware Scribe 49.95 (Disk editor-text formatter) Shipping add \$3.00 C.O.D. & Foreign handling add 15% MasterCard and Visa accepted. Post Office Box 305 Solana Beach, California 92075 (619) 755-4373

DUGGER'S GROWING 由 SYSTEMS

DEALER INQUIRIES INVITED



If the same old news and reviews cause you to snooze then choose:

or

Forum Sixty-Eight

Forum Sixty-Eight is new to date and will prove itself real soon. So rouse from your slumber and get the first number Cause the first issue's coming in June.

Forum Sixty-Eight is the journal for Motorola Microprocessors. The forum covers business, scientific and recreational computing.

Color Computer News

Color Computer News will wake your computer and open your eyes up wide. And soon you'll discover from cover to cover there's lots of good info inside.

Color Computer News is the *original* Color Computer magazine covering the entire spectrum of Color Computing from beginner to advanced.

REMarkable Software, Inc. P.O. Box 1192 Muskegon, MI 49443 (616) 728-9100	The 12 issue subscription rate is: United States \$21.00 Canada/Mexico \$38.00 Foreign \$66.00 Combination Subscription \$39.00 (U.S. only)	Kelly Software Dist. P.O. Box 11932 Edmonton, Alberta T5J 3L1 CANADA Canadian subscriptions to Color Computer News only
Name:		
Address:		
City:	State:	Zip:
□ Visa/Mastercard #	Expiration	Date:
Color Computer News	Forum Sixty-Eight	Both
Subscription begins with next ava	ilable issue	Allow 8-10 weeks for delivery

Double Density Software

Now even more +PLUS + features than before!!! \$39.95 New and Improved!! \$39.95 (TAPE)

An Intelligent Terminal Program For The Color Computer or TDP 100.

- Communications BAUD rate: 110-19200
- Change printer BAUD rate: 600-9600
- Select printer line feeds if needed
- Select Half or Full Duplex
- Select Odd, Even, or No Parity
- Select 7 or 8 Bit Words
- Select 1 or 2 Stop Bits
- Send Control Characters
- Separate Keys for Escape & Delete (Rubout)
- Turn off those UGLY Lower-case letters
- Word Wrap eliminate all split words
- Selectable Reverse or Normal Video
- Scroll protect up to nine lines
- Automatic capture of incoming files
- Send one line at a time from your buffer
- Has programmable prompt for "send next line"
- Disk version extras: List Directory, Granules
- Buffer Size Indicator
- Complete up and down load support
- Improved buffer editor in both versions
- On/Off Line Cassette/Disk Reads & Writes
- Save & Load Machine Code, BASIC Programs or Files
- On/Off Line Scrolling of Buffer
- Dealer inquiries Pre-enter Data before going on line

 $N_{\Theta W}$ and

Improved!

Easy to read manual is included with each program

PRICE \$29.95 (Tape) \$39.95 (Disk) 16k or 32k Req.

COLOR DISK SAVER

Saves a disk to tape. Reloads disk from saved tape. Also has tape verify command! 32k Ext. BASIC Req. PRICE \$12.95 (tape)** D

COLOR BIORHYTHM Are you up or down today, tomorrow, or years from now? Find out with COLOR BIORHYTHM. Uses high res graphics. Send the chart to printer. 16k or 32k Ext. BASIC Req. PRICE \$14.95 (tape) D

AUTO LOAD Auto Load will put any program or file from tape to disk! All machine language programs that load below the top of your disk system are modified so that they will operate properly with a disk system!

16k or 32k Ext. BASIC Req PRICE \$12.95 (tape)*

Save!!

Adventure! 32K ext. BASIC Req.

use 35, 40 or 80 track (double or single sided) drives all on one system, all at the same time! Your system could consist of a 35 track drive, a two drive AMDEK system, and an 80 track drive, all working, and hooked up to your system! (The AMDEK drives are 40 track drives.) ALL commands are supported in DOUBLE DOS BASIC. The DOS is totally transparent to your BASIC programs! If your system selection is 80 tracks, a PRINT FREE command will return 158 granules! Compare this to the 68 granules your system now returns! The 40 track drives would return 78 granules, 10 more than the 35 track system. EVERY command in BASIC is supported by DOUBLE DOS

That's right! Using your 64K Color Computer, and an 80 track

drive, you too can have more than TWICE as much storage on

your disk drive system. DOUBLE DOS BASIC allows you to

BASIC. If you haven't already upgraded to 64K, now is the time! Use your system to its FULLEST! DOUBLE DOS BASIC also gives you RESET PROTECTION, unlike most of the other 64K programs. AND, used with our ROM MOVE program, you can also get another 8000 bytes of BASIC addressable memory!

DOUBLE DOS BASIC — \$24.95 ROM MOVE - \$12.95

DOUBLE DOS & ROM MOVE — \$29.95

DOUBLE MAILER

At last a powerful, easy to use, mailing list program for a

reasonable price. Up to 200 names can be held in memory for you to change or print as you like. Plus, you can print out up to 1800 names without touching the keyboard. The machine language sort routine will sort 200 names in as little as 6 seconds! Supports single or double labels. Three and four line labels can be intermixed at will, the print out will adjust accordingly. All this and much more!

Price: \$19.95; Tape \$21.95; Disk (32K Req.).

COLOR KEY COMMAND

Looking for a powerful programmer's aid, but you don't have a fortune to spend? This program is for you! Look at these features: two keystroke entry of more than 80 Basic, Extended Basic, and Disk Basic commands. Select the color of your cursor. Select the prompt you want - no more "OK" when a program bombs! Automatic line numbering — you select the start line and increment! 4 custom programmable keys for a total of 64 characters each — enter whole lines with two key presses! Copy any line with the copy command. Merge tape programs together automatically. Redefine any or all keys with a short basic program we supply.

Not all features are available on every machine; some require PRICE \$26.95 Disk only Extended or Disk Basic to work properly.

16K or 32K Req. PRICE \$18.95 (tape)* D

FREE PROGRAMS!! Get a FREE utility program when you buy a copy of COLOR KEY COMMAND! Your choice of COLOR DISK SAVER, DD CLOCK, SUPER PEEKER, TAPE NAME, AUTOLOAD, or CURSOR II. Save up to \$12.95! COLOR KEY COMMAND is only \$18.95 (Tape) * D.

AND THAT'S NOT ALL!!! Buy COLOR TERM + PLUS+ and the SUPER PRO keyboard and pay only \$59.95 for the keyboard! AMDEK DISK SYSTEM!! This is one of the hottest selling new items to come along in years! AMDEK DISK DRIVE only \$499.00. Save \$100.00!! Buy an AMDEK DISK DRIVE and our RS CONTROLLER together and pay only \$649.00! We'll throw in the cable FREE!!

ROM SWITCH Change from BASIC to EXTENDED BASIC, to DISK BASIC and back again with ROM SWITCH! You can even press the RESET button, and with one POKE, restore the system! PRICE \$9.95 64K required * D.

公

DOUBLE CABLE If you are tired of switching cables every time you need to use your MODEM and PRINTER together, this is the fix! Only \$14.95.

GALACTIC MATH

Load this game into your computer and start playing! This is a math tutor that is really an arcade game! Keep those saucers from landing! There are no "happy faces" or "funny clowns" in this math program.

REPLACEMENT KEYBOARD KIT \$64.95

16K or 32 Ext BASIC Req. PRICE \$15.95 (tape) D

COLOR COMPUTER/TDP-100



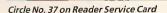
* All machine code D Disk Compatible

\$2.00 shipping and handling on all orders. No extra charge on COD orders, Mastercard and VISA accepted. Texas residents add 5% sales tax. Allow two weeks for personal checks. Send 20 cent stamp for free catalog.



Double Denzity Software 920 Baldwin Street Denton, Texas 76201 Phone 817/566-2004.





OF	H OF MESSAGE		TABLE OF TEMPOS: NUMBER OF CYCLES FOR SOUND, LENGTH OF SOUND		MESSAGE TO ME:PROGRAM LENGTH	SCOTBL 3012 SDELAY 300B SETA 3242 SETD 3238 SLOOP1 3025 SLOOP1 3025 SLOOP2 3030 SNDBYT 301D START 301D START 301D THOON 300E TWPONO 300E TWPONO 300E TROOF TROOF TROOF WC XARRAY 3411 YARRAY 3411 YARRAY 340E ZEND 35AB
LENGTH	LENGTH '1' '8' LENGTH TEMPO/	SPACE	TABLE NUMBE FOR S		SSAGE T	3146 33077 33077 33077 33002 33002 31006 3114 3118 3118 3118 3113
12 /ENTER	3 \$71 \$6D \$78 12 /LAST	\$78 \$00	\$34 \$27 \$27 \$21	\$118 \$015 \$005 \$005	A.F	MORE NEWGAM NEWT1 OX POY PAUSE PAUSE POSTOX POSTOX POSTOX POSTOX POSTOX RANDOM RANDOM RANDOM RANDON RECOP 1 RECOP 2 RECOP 2 RECOP 2 RECOP 2 RECOP 2 RECOP 2 RECOP 2 RECOP 3 RECOP 2 RECOP 3 RECOP 3 RE
FCB	FCB FCB FCB FCB	FCB	FCB FCB FCB FCB	FCB FCB RMB	EQU	O > - 4
IMPMES	LSTIMP		TTBL	XARRAY	ZEND	3060 3157 3064 30674 3074 30774 3187 3187 3188 33189 33189 33189 33189 33189
05380 TM	05420 05420 05420 05430 05440 L	05460		05550 05550 05560 05570 05580 X	05600 05610 05620	LBL1 LBL10 LBL12 LBL3 LBL3 LBL3 LBL6 LBL6 LBL9 LBL9 LBL9 LBL0 LBL0 LBL0 LBL0 LBL0
0C 454E54455220 54454D504F20	03 71 6D 78 0C 4C4153542054 454D504F	7.A D0	3 A 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1.8 0.E	35AB 301A TOTAL ERRORS	## 3300 ## 3000 ##
33EB 33EC 45 54	33F8 33F9 33FA 33FB 33FC 33FC	3407	3409 340B 340C 340D	340E 340E 3410 3411	0	BITSEL BORDER BUGS CLOOP COOLIT CRASH CS DN DN DX DY DY EL EXTT EXTT FIRST HP HP HSP GETPOS HSP HSP HSP HSP HSP HSP HSP HSP HSP HS
ONE MORE CRASH MAKE LOWER-CASE ASCII	DISPLAY # CRASHES LET 'EM SEE IT 5TH CRASH? YES SET UP ANOTHER BOARD		LENGTH OF MESSAGE "=" LENGTH OF MESSAGE ES/	"=" LENGTH OF MESSAGE SCORE /	: : *	L NEW HIGH SCORE? NOPE YEP, STORE IT SHOW SCORE THIS GAME OVERWRITE 'CRASHES' PUT HIGH SCORE COVERWRITE 'CRASHES' TEMPT THE PLAYER RESTORE DIRECT PAGE FOR RETURN TO BASIC RE-ENABLE INTERRUPTS BACK TO BASIC LENGTH OF MESSAGE ER/
SOUND CCS #\$35	\$5 FF -1,Y PAUSE #\$30 DONE		/SCORE / \$7D 14 /CRASHES	/ LEFT \$7D 12 /HIGH	\$7D CRASH***	#2 -1,Y COOLIT BORDER (ASCOTBL (ASTBL N CASTBL N
LBSR INC LDA	SUBA STA LEAY BNE CMPA LBEQ	40	FCB FCB FCB	FCC FCB FCC	FCB	LEAY BNE BNE BNE BNE BNE CAPD CAPD CAPD CAPD CAPD CAPD CAPD CAPD
04800 04810 04820	04830 04840 04850 PAUSE 04870 04880		04930 SCMES 04940 04950 04960 CLMES 04970	04990 04990 05000 HSMES 05010	* *	05060 05070 05080 05080 05180 05180 05110 05130 05130 05130 05140 05170 05210 05220 05220 05220 05220 05230 05230 05230 05230 05230 05230 05230 05230 05230 05230 05230 05230 05230 05230 05230 05230 05230 05230
	90 11 B7 05FF 31 3F 26 FC 81 30 1027 0027 16 FF4B		07 53434F524520 7D 0E 435241534845	204C45465420 7D 0C 484947482053 434F524520	70	86 02 26 FC 4A 4A 4A 1093 18 1093 18 1093 18 1093 18 1093 18 1093 18 1093 18 1093 18 1095 18 17 FDC1 17 FDC1 18 CE 17 FDC1 18 CE 17 FDC1 18 CE 19 SE 10 SE 10 SE 10 SE 10 SE 11 FE 12 FE 13 SE 14 FE 16 FE 18 SE 16 FE 17 FE 18 SE 18 SE 19 SE 10 SE
	3378 3377 3377 3377 3381 3381 3383		338A 338B 3391 3392 3393	339A 2 33A0 33A1 33A2 4	33AD	333BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB



SOFTWARE FOR YOUR MICROCOMPUTER



(800) 327-7172



Atari Version

ATARI

ALLY SPEEDWAY

by John Anderson

A colorful, scrolling roadscape serves as an exciting backdrop for fun-injected action — choose one of several different courses provided or "construct" your own. Players are challenged to hot rod their joystick-controlled cars down grueling straightaways, around hairpin corners and past an ever-changing landscape that includes houses, lakes, orchards and more. Work on improving your lap time with a solo game, or invite a friend along for a one-on-one duel to the finish line — there's plenty of excitement to go around! Joystick required.

ATARI 400/800/1200 16K Cartridge 053-0171 \$49.95 (£35.99 inc. VĂT)





Atari Version

ATARI



PREPPI

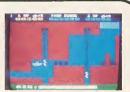
by Russ Wetmore

Up-and-coming prepster Wadsworth Overcash is the star of PREPPIE! Wadsworth's in quite a bind, too, and he's depending on you to help him negotiate a wide range of dangers on the most harrowing golf course in America, the precarious Nasty Nine.

Real-time machine language graphics bring it all to energetic life while coaxing a full twentyeight colors from your ATARI 400 or 800. And PREPPIE! also features an outrageous musical repertoire that supplements the rib-tickling sound effects. Joystick required.

ATARI 400/800/1200 16K TAPE 050-0147 \$29.95 (£21.99 inc. VAT) ATARI 400/800/1200 32K DISK . . . 052-0147 \$29.95 (£21.99 inc. VAT)





Atari Version

APPLE CoCo **ATARI** IBM **TRS-80** COM. 64

> Nominated by Electronic Games Magazine for "1984 Best Action

Computer Game'

SEA DRAGON

by Wayne Westmoreland & Terry Gilman Atari Version by Russ Wetmore

Apple Version by John Anderson Color Computer Version by Coniah Software IBM Version by Dan Rollins Commodore 64 Version by Dave Simmons

Secure all hatches! Prepare to dive! Sea Dragon puts you in command of a nuclear sub that's armed to the hilt with deadly missiles and torpedoes. You guide your submarine past underwater mountains and through labyrinthine passages while avoiding webs of explosive mines that rise from the seabottom. And two-player option and sounds go hand in hand with the kind of graphics you've come to expect from Adventure International. Joystick required on

Please Note: The above is a description of the TRS-80 version; all

other versions are similar.			
APPLE 2 48K DOS 3.3	042-0146	\$34.95	(£25.49 inc. VAT)
ATARI 32K DISK	052-0146	\$34.95	(£25.49 inc. VAT)
ATARI 16K TAPE	050-0146	\$34.95	(£25.49 inc. VAT)
TRS-80 16K TAPE Model 1 & 3 .	010-0146	\$24.95	(£17.99 inc. VAT)
TRS-80 32K DISK Model 1 & 3 .	012-0146	\$24.95	(£17.99 inc. VAT)
TRS-80 32K TAPE CoCo	060-0146	\$34.95	(£25.49 inc. VAT)
IBM 128K DISK	132-0146	\$34.95	(£25.49 inc. VAT)
COMMODORE 64 TAPE	190-0146	\$34.95	(£25.49 inc. VAT)
COMMODORE 64 DISK	192-0146	\$34.95	(£25.49 inc. VAT)





Atari Version

ATARI

PREPPIE

by Russ Wetmore

In PREPPIE II! Wadsworth returns to face a battery of tests designed to test his mettle as a Brother. Surviving, er... passing, the tests means advancement to the next level for further "evaluation." The "testing area" will include an array of pits, traps, secret passageways, revolving doors, and a surprise, unknown hazard. And — there will be special cameo appearances by "guests" from PREPPIE!, too!

The prepster you couldn't keep down on the Nasty Nine is back and as resilient as Bubble Yum. Make a date today for fun — PREPPIE II! Joystick required.

ATARI 400/800/1200 16K TAPE 050-0175 \$34.95 (£25.49 inc. VAT) ATARI 400/800/1200 32K DISK 052-0175 \$34.95 (£25.49 inc. VAT)

INDEX

PAGE	
	Maxi Mail
Bug Off	
C'est La Vie	Rally Speedway
C.R.I.S. 14 Curse of Crowley Manor 9	S.A.G.E
Diskey 12	Sea Dragon
Earthquake: San Francisco 1906	Search for Elsoliado
Fire Copter 4	Stratos 4
Gnome Valley Back Cover	Toxic Dumpsite/Spook House10
Labyrinth of Crete	Triad Back Cover Tutti Frutti 5
Maxi Accountant	Ultra Disassembler
Maxi CRAS	War 11

ATTENTION FOREIGN ORDERS!

Scott Adams, Inc., is proud to announce that Retail European and all U.K. mail orders may now be placed with our new offices in the United Kingdom.

Adventure International U.K. 119 John Bright Street Birmingham, UK B1 1BE

Phone orders may be placed at: 021-643-5102
Please Note!

Requests for catalogs to be sent from the U.S. to overseas must be accompanied by \$3.00 to cover postage and handling.

USE OUR TOLL-FREE PHONE NUMBER TO PLACE YOUR ORDER! (800) 327-7172

Scott Adams' Computers: 178 Oxford Road, Fern Park, FL 32730 Phone (305) 339-8914, and 1705 W. Oakridge Rd., Orlando, FL. 32809 Phone: (305) 857-8351 STOP IN — Just a short ride from DISNEY WORLD!

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Apple is a trademark of Apple Computer, Inc.
Atari is a trademark of Atari, Inc.
Commodore 64 is a trademark of Commodore Electronics Ltd.
TRS-80 Color Computer is a trademark of the Tandy Corporation
IBM is a registered trademark of International Business Machines Corporation
TRS-80 and TRSDOS are trademarks of the Tandy Corporation.

© COPYRIGHT 1983 - ADVENTURE INTERNATIONAL

LIMITED WARRANTY

SCOTT ADAMS, Inc. shall have no liability to any entity with respect to any liability, loss or damage caused by this product. This product will be exchanged if defective in manufacture; except for such replacement, the sale of this program material is without warranty or liability. Magnetic material may not be copyable on user's system using standard copying procedures. All media are warranted to load for 1 year from date of purchase. If defective, return original media and proof of purchase for free replacement. Beyond 1 year also include \$5.00 handling charge per item.

ORDERING INFORMATION

Retail orders from the U.S. will be accepted with cash, check, money order, a credit card (Visa, MasterCard, or American Express), or C.O.D. Foreign orders will be accepted with Bank of America, Visa, or MasterCard — no checks or C.O.D. orders can be accepted.

Dealers may have credit terms granted upon application. For information on becoming an Adventure International dealer, contact a Sales Representative at (800) 327-7172.

Florida customers must include 5% sales tax with their orders. If merchandise is for resale, include a standard completed and signed resale permit card — tax numbers are not sufficient. Adventure International's business hours are 9 a.m. to 5 p.m. EST Monday through Friday. Our customer service number is (305) 862-6917.



Color Computer Version CoCo

FIRE COPTER

by Dale Lear

FIRE COPTER serves up a tasty helping of coin-op realism as the player is treated to a bird's-eye view of flight over a huge city. The object of FIRE COPTER is to extinguish as many fires as possible before the entire city burns. Along the way, fire-starting androids may be encountered which should be dispatched with your lasers posthaste!

FIRE COPTER is joystick-controlled and accommodates one or two players. Ready for threedimensional realism? Then you're ready for FIRE COPTER - the hot new game from Adventure International! Great sounds too!

COLOR COMPUTER 16K TAPE 060-0176 \$24.95 (£17.99 inc. VAT)





Atari Version

ATARI COM. 64 TRS-80

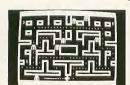
ATARI and COMMODORE 64 Versions by Neil Larimer TRS-80 Version by John E. Cominio

This is STRATOS - a kaleidoscopic explosion of awesome graphics and other-worldly sounds. STRATOS puts you in TOTAL control of the devastating Armageddon Wave - the only weapon capable of decimating the attacking alien ships. STRATOS comes loaded with the professional features you've come to expect, including one or two player option, high score save, and mind-melting sounds.

Designed for the home arcader who takes his action white-hot, you can be certain the thrills don't let up with this scorcher! Joysticks optional on TRS version; required for ATARI version.

ATARI 400/800 16K TAPE	200-0161	\$34.95	(£25.49 inc. VAT)
ATARI 400/800 32K DISK	202-0161	\$34.95	(£25.49 inc. VAT)
COMMODORE 64 TAPE		\$34.95	(£25.49 inc. VAT)
COMMODORE 64 DISK	202-0161	\$34.95	(£25.49 inc. VAT)
TRS-80 16K Model 1 & 3 TAPE .	010-0161	\$24.95	(£17.99 inc. VAT)
TRS-80 32K Model 1 & 3 DISK .	012-0161	\$24.95	(£17.99 inc. VAT)





TRS-80 Version

COM. 64 TRS-80

ASER BALL

by Neil Matson & Matthew T. McMahon

The action begins when your Laser Ball comes to life in the center of a twisting maze. Maneuver it using either joystick or keyboard controls. The object of the game is to fill the maze completely with dots while avoiding the deadly destructoids that inhabit this lethal network of twists and turns.

LASER BALL! All of the extras you demand are here: two player option, multiple skill levels, speedy machine language graphics, running high score, great sounds and action like you've never had with a micro!

TRS-80 16K TAPE			
COMMODORE 64 TAPE	170-0217	\$24.95	(£17.99 inc. VAT)
COMMODORE 64 DISK	172-0217	\$24.95	(£17.99 inc. VAT)





Color Computer Version

APPLE **ATARI** CoCo

COM. 64 IBM **TRS-80**

AREX

by William Muk

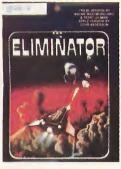
Atari & Commodore 64 Versions by John Anderson Apple Version by Gordon Eastman IBM Version by John White

Color Computer Version by Roger Schrag
AREX — Enter and neutralize at least 90% of
the enemy's territory while avoiding 3 distinct
types of alien ships. A successful invasion earns advancement to subsequent (and, of course, more difficult) levels of play.

AREX features phenomenal graphics routines, high score retention, one- or two-player option and

multiple skill levels.

ATARI 16K TAPE	200-0172	\$34.95	(£25.49 inc. VAT)
ATARI 16K DISK	202-0172	\$34.95	(£25.49 inc. VAT)
COMMODORE 64 TAPE	200-0172	\$34.95	(£25.49 inc. VAT)
COMMODORE 64 DISK	202-0172	\$34.95	(£25,49 inc. VAT)
APPLE 48K DISK	042-0172	\$34.95	(£25.49 inc. VAT)
IBM 64K DISK	132-0172	\$34.95	(£25,49 inc. VAT)
COLOR COMPUTER 16K TAPE	060-0172	\$34.95	(£25,49 inc. VAT)
TRS-80 16K TAPE Model 1 & 3.	010-0172	\$34.95	(£25.49 inc. VAT)
TRS-80 32K DISK Model 1 & 3 ,	012-0172	\$34.95	(£25.49 inc. VAT)





Apple Version

APPLE ATARI CoCo COM. 64 TRS-80

THE ELIMINATOR

by Wayne Westmoreland & Terry Gilman APPLE Version by John Anderson ATARI Version by Steve Coleman COLOR COMPUTER Version by Britt Monk Commodore 64 Version by Americomp

Your mission unfolds at a breakneck pace as you pilot your Eliminator craft over alien terrain and square off against hoards of marauding enemy ships. But the action doesn't stop there! THE ELIMINATOR pulverizes the competition with realistic sounds, superlative graphics, running high score and joystick compatibility on ALL versions — and these are just a few of the many "extras" included.

*TRS-80 16K TAPE Model 1 & 3	010-0134	\$24.95	(£17.99 inc. VAT)
*TRS-80 32K DISK Model 1 & 3.	012-0134	\$24.95	(£17,99 inc. VAT)
APPLE 2 48K (DOS 3.3 required)	042-0134	\$29.95	(£21.99 Inc. VAT)
ATARI 400/800 16K TAPE	050-0134	\$24.95	(£17.99 inc. VAT)
ATARI 400/800 32K DISK	052-0134	\$24.95	(£17.99 inc. VAT)
COLOR COMPUTER 16K TAPE	060-0134	\$24.95	(£17.99 inc. VAT)
COMMODORE 64 TAPE	190-0134	\$24.95	(£17.99 inc. VAT)
COMMODORE 64 DISK	192-0134	\$24.95	(£17.99 inc. VAT)
*The TRS-80 version is licensed	as a "Defe	nder" gar	me from Williams
Electronics!			





Atari Version

ATARI

BUG OFF!

by Sparky Starks

Your garden has fallen into a Florida sinkhole where weird forces have mutated a bevy of bizarre bugs into a contingent of killers! In this case, relief is spelled D-D-T, and you'll need oodles of it to dispatch these pesky pests!

The object of the game is to control the seven different types of bugs that are threatening to run helter-skelter over everything. Features great sounds and multiple skill levels. For one or two players. Joysticks required.

ATARI 400/800 16K TAPE	050-0167
\$9.95 (£6.42 inc. VAT)	
ATARI 400/800 32K DISK	052-0167

\$9.95 (£6.42 inc. VAT)





Atari Version

APPLE ATARI CoCo TRS-80

REAR GUARD

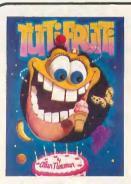
by Wayne Westmoreland and Terry Gilman Color Computer and Com-64 Versions by Coniah Software APPLE Version by John Anderson ATARI Version by Neil Larimer, assisted by Sparky Starks

You are charged with protecting your mothership from the deadly waves of inhuman Cyborgs. Destroy them before they reach the mothership.

REAR GUARD flaunts the full range of your

REAR GUARD flaunts the full range of your computer's sound capabilities, and features graphics so crisp and fluid that they actually seem to border on advanced computer animation! REAR GUARD also includes advanced play levels, running high score, sharp graphics, horizontal scrolling and truly mind-boggling sounds. For one or two players. Joysticks optional on TRS-80 version.

TRS-80 16K TAPE Model 1 & 3.	010-0143	\$24.95	(£17.99 inc. VAT)
TRS-80 32K DISK Model 1 & 3.	012-0143	\$24.95	(£17,99 Inc. VAT)
COLOR COMPUTER 16K TAPE	060-0143	\$24.95	(£17.99 inc. VAT)
ATARI 400/800 16K TAPE	050-0143	\$19.95	(£14.49 inc. VAT)
ATARI 400/800 32K DISK	052-0143	\$24.95	(£17.99 inc. VAT)
APPLE 48K DISK DOS 3.3	042-0143	\$29.95	(£21.99 Inc. VAT)
COMMODORE 64 TAPE	190-0143	\$24.95	(£17.99 inc. VAT)
COMMODORE 64 DISK	190-0143	\$24.95	(£17.99 inc. VAT)
Apple version slightly diff	erent from	above d	escription





Atari Version

ATARI

TUTTI FRUTTI

by Alan M. Newman

TUTTI FRUTTI is a colorful, machine language game for one or two players that'll have the whole family camped out around the ATAR!! The action takes place in a jungle clearing where your joystick-controlled Hungry chows down on a variety of exotic fruits and pastries. Eat everything, and advance to the next level.

TUTTI FRUTTI will give your ATARI a real workout with its hi-res graphics, vivid colors, and lively sounds. And, you have complete control over numerous options, including the speed of the attacking bugs, the amount of fruit available on each level and lots more.

Guaranteed to be "grape fun" for one or two players!

ATARI 400/800 16K TAPE 050-0160 \$9.95 (£6.42 inc. VAT) ATARI 400/800 32K DISK 052-0160 \$9.95 (£6.42 inc. VAT)



THE ADVENTURE SERIES: AN OVERVIEW

By definition, an adventure is a dangerous or risky undertaking. On your personal computer, Adventure is that and more!

Playing any of the Adventures includes three elements: you, the user; the games themselves; and the author, Scott Adams of Orlando, Florida.

In beginning any Adventure, you will find yourself in a specific location: in a forest, maybe on

board a small spaceship, or perhaps in a desert. The top portion of your video display will tell you where you are and what you see; the bottom section of the display is devoted to inputting commands to your robot computer and receiving messages that may arise as the result of your

By using two-word commands you move from location to location (they're called "rooms", though some rooms represent outdoor sites like a swamp), manipulate objects that you find in different rooms (pick them up, put them down, carry them, etc.) and perform actions as if you were really there.

The object of the game is to amass treasure for points or accomplish a specified task. Successfully completing a game, however, is far easier to discuss than to achieve. In many cases you will find a treasure but be unable to take it until you are carrying the right combination of objects that you'll find in various locations.

If you're tired of video games with bouncing balls, or bored with shooting at targets, and you're ready for an intellectual challenge that transports you to new worlds of experience; if you want to see what a skilled programmer can do with a micro, then invest in one of Scott Adams' games. An early Adventure (Adventureland or Pirate Adventure) is a good place to start, because the more Adams creates, the tougher his puzzles get.

Peprinted with permission from PERSONAL COMPUTING MAGAZINE, FEB. 1980 PERSONAL COMPUTING MAGAZINE, 1050 Commonwealth Ave., Boston, Mass. 02215

THE GRAPHIC ADVENTURES

As the name implies, the Scott Adams Graphic Adventures are Scott's classic text Adventures enhanced with exciting hi-res graphics — graphics which colorfully depict your voyage into wonderment each and every step of the way. Each Adventure challenges the player to accumulate points, crack a mystery or accomplish a goal using the unique tools of Adventuring: two-word commands, some common sense and a little ingenuity.

If you've never played an Adventure, here's the place to begin. If you're an experienced Adventurer, prepare for a magical encounter unlike any other. Remember: Anything can happen when you play a Scott Adams Graphic Adventure . . . and it usually does!

See individual descriptions on opposite page.















(£35.99 inc. VAT)

ADV.	S.A.G.A. [™] APPLE 2 PLUS 48K DISK Requires DOS 3.3	S.A.G.A.™ ATARI 48K DISK	STANDARD ATARI 400/800 24K TAPE 400/800	TEXAS INSTRUMENTS TAPE* *(Requires Command Module) See Below	STANDARD COLOR COMPUTER 16K TAPE	ADV.	STANDARD ATARI 400/800 TRS-80 MODEL 1 & 3 32K DISK	NORTHSTAR CP/M HORIZON & ADVANTAGE 51/4" DISK
1	042-0201 \$39.95	052-0201 \$39.95	050-0001 \$19.95	110-0001 \$29.95	060-001 \$19.95	†1-2-3	072-0010 \$39.95	152-0010 \$49.95
2	042-0202 \$39.95	052-0202 \$39.95	050-0002 \$19.95	_	060-0002 \$19.95	†4-5-6	072-0011 \$39.95	152-0011 \$49.95
3	042-0203 \$39.95	052-0203 \$39.95	050-0003 \$19.95	110-0003 \$29.95	060-0003 \$19.95	†7-8-9	072-0012 \$39.95	152-0012 \$49.95
4	042-0204 \$39.95	052-0204 \$39.95	050-0004 \$19.95	110-0004 \$29.95	060-0004 \$19.95	†10-11-12	072-0130 \$39.95	152-0130 \$49.95
5	042-0205 \$39.95	052-0205 \$39.95	050-0005 \$19.95	110-0005 \$29.95	060-0005 \$19.95	Special Command Module & Adventure #2 Combination Package '(Command Module Required for all Adventures) Tape 117-0002 \$49.95 PRICE CONVERSION CHART U.S. DOLLAR TO POUNDS STERLING		
6	042-0206 \$39.95	052-0206 \$39.95	050-0006 \$19.95	110-0006 \$29.95	060-0006 \$19.95			
7	Coming Soon	Coming Soon	050-0007 \$19.95	110-0007 \$29.95	060-0007 \$19.95			ntures)
8	Coming Soon	Coming Soon	050-0008 \$19.95	110-0008 \$29.95	060-0008 \$19.95			
9	Coming Soon	Coming Soon	050-0009 \$19.95	110-0009 \$29.95	060-0009 \$19.95			STERLING
10	Coming Soon	Coming Soon	050-0098 \$19.95	#10 & #11 Comb.	060-0010 \$19.95	\$ 6.95 \$19.95		I.99 inc. VAT) I.49 inc. VAT)
11	Coming Soon	Coming Soon	050-0128 \$19.95	110-0156 \$39.95	060-0011 \$19.95	\$29.95	(£21	.99 inc. VAT)

See page 8 for details on Scott's newest Adventure!

12 Coming Soon Coming Soon 050-0129 \$19.95 110-0129 \$29.95 060-0012 \$19.95

TRS-80 MODEL 2 - 8" DISK — Adventures 1 thru 12 (REQUIRES TRSDOS 2.0) . . 022-0137 \$129.95 (£93.49 inc. VAT) CP / M (Z-80) SINGLE DENSITY 8" DISK — Adventures 1 thru 12 (£93.49 inc. VAT) 122-0137 \$129.95 CP / M CONVERSIONS by Russ Wetmore — Color Computer versions by Roger Schrag

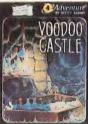
† Special Value Packs

New - Adventure #13, See Page 8

























HINT AND SOLUTION BOOK

Our hint book provides additional clues to help you out of some of those sticky spots you've gotten into, while still letting you solve the Adventure vourself. So if you can't seem to get out of the bog or locate the pharoah's heart, then you've come to the right place for help! This expanded edition includes hints for all 14 Adventures, and a special section on the making of Adventure maps.

SKILL KEY

BEGINNER: Ideal for younger players or first-time Adventurers. Minimum problem-solving skills required. Average completion time: 5 hours or

MODERATE: Some Adventuring experience needed. Moderate problem-solving skills required. Average completion time: 7 hours or more.

ADVANCED: Recommended for experienced players. Advanced problem-solving skills required. Completion time varies substantially with experience.

THE ADVENTURES

#1 ADVENTURELAND — Wander through an enchanted realm and try to uncover the 13 lost treasures. There are wild animals

and try to uncover the 13 lost treasures. There are wild animals and magical beings to reckon with as well as many other perils and mysteries. This is the Adams Classic that started it all! Difficulty Level: Moderate

#2 PIRATE ADVENTURE — Only by exploring this strange island will you be able to uncover the clues necessary to lead you to your elusive goal — recovering the lost treasures of Long John Silver. Difficulty Level: Beginner

#3 ADVENTURE #3 — In this exciting Adventure, time is of the essence as you race the clock to complete your mission in timeor else the world's first automated nuclear reactor is doomed! If

or else the world's first automated nuclear reactor is doomed! If

or else the world's first automated nuclear reactor is doomed! If you survive this challenging mission, consider yourself a true Adventurer! Difficulty Level: Advanced
#4 VOODOO CASTLE — The Count has fallen victim to a fiendish curse placed on him by his enemies. There he lies, with you his only possible hope. Will you pull off a rescue, or is he really down for the Count?! Difficulty Level: Moderate
#5 THE COUNT — It begins when you awake in a large brass bed in a castle somewhere in Transylvania. Who are you, what are you doing here and WHY did the postman deliver a bottle of blood? Difficulty Level: Moderate
#6 STRANGE ODYSSEY — At the galaxy's rim, there are rewards aplenty to be harvested from a long-dead alien civilization, including fabulous treasures and advanced technologies far beyond human ken! Prepare yourself for the incredible! Difficulty Level: Moderate Level: Moderate

#7 THE MYSTERY FUN HOUSE — As Adventure #7 begins, you find yourself hopelessly lost in the middle of a carnival fun

house. While escape may elude you, one thing is very clear — you're NOT here to have a good time! Difficulty Level: Moderate #8 PYRAMID OF DOOM — This is an Adventure that will transport you to a dangerous land of crumbling ruins and trackless desert wastes into the PYRAMID OF DOOM! Jewels, gold — it's all here for the plundering — IF you can find the way. Difficulty Level: Moderate

#9 GHOST TOWN — You must explore a once-thriving mining town in search of the 13 hidden treasures. With everything from rattlesnakes to runaway horses, it sure ain't going to be easy! Includes a special bonus scoring system too! Difficulty Level:

#10 SAVAGE ISLAND PART I - A small island holds an awesome secret — will you be able to discover it? This is the beginning of a two-part Adventure. (The story continues in SAVAGE ISLAND PART 2, ADVENTURE #11.) NOTE: This one's a toughie - for experienced Adventurers only! Difficulty Level:

Advanced #11 SAVAGE ISLAND PART II — The suspense begun in Adventure #10 now comes to an incredible conclusion with SAVAGE ISLAND PART II! This Adventure requires you to have successfully finished #10, wherein you were given the secret password to begin this final half. NOTE: For experienced Adventurers only! Difficulty Level: Advanced #12 GOLDEN VOYAGE — The king lies near death in the royal palace. You have only three days to bring back the elixir needed to relivengte him. Journey through the lands of magic fountains.

to rejuvenate him. Journey through the lands of magic fountains, sacred temples, stormy seas and gold, gold, GOLD! This one is for experienced Adventures only! Difficulty Level: Advanced

#13 SCORCERER OF CLAYMORGUE CASTLE - New! See

ADVENTURE



ADVENTURE #13

Long ago, in times passed beyond remembrance, Solon the Master Wizard and wearer of the Secret Cloak lost the 13 Stars of Power. The grasping Vileroth believed the Stars to be the only source of Solon's expert wizardry. But, unbeknownst to Vileroth, it was the Secret Cloak that controlled the Stars and protected the wearer

from their awesome power. Unable to master the Stars, Vileroth was undone.
In his final days, as Vileroth's strength slipped from him, he concealed the 13 Stars of Power within the Castle of Claymorgue, determined that no one save he should possess them. Solon, learning of Vileroth's destruction, dispatched his faithful young apprentice Beanwick to retrieve the Stars.

'Tread carefully, O Beanwick! Would that I could assume this quest myself, but alas, I can only send with you these few spells. Claymorgue Castle harbors further spells, but beware - one unskilled in the magical arts cannot predict their

At last! The long-awaited Adventure #13 by Scott Adams!

(£17.99 inc. VAT) (£14.49 inc. VAT) (£25.77 inc. VAT) Requires DOS 3.3

S.A.G.A. ATARI 48K DISK 052-0013 \$39.95



Atari Version

STONE OF SISYPHUS

Chameleon Software Graphic Versions by David Simmons APPLE ATARI

APPLE

"Ah, welcome to our dungeon!" Yes there's adventure and treasure aplenty here. What's that you ask? Any monsters, trolls or orcs? Well, maybe a few teeny weeny ones. Not to worry though, we're very generous about giving your character hordes of "prime attributes" - you know, lots of strength, luck, charisma, and the like. And you'll find comfort in the fact that your character has three (count 'em, 3) lives! Course, I'd be less than honest if I didn't say I think you'll need them — but step inside. I think I've got a suit of armor you can't live without (heh, heh!). Skill Level: Moderate. Suggested age group 12-Adult. Graphics available on Apple Version. Includes Two Full Disks of Data! (will work on 1 or 2 Disk Drive Systems)

TRS-80/I 32K DISK 032-0100 \$29.95 (£21.99 inc. VAT) (£21.99 inc. VAT) TRS-80/III 48K DISK 032-0100 \$29.95 **ATARI 48K DISK** 052-0100 \$39.95 (£28.99 inc. VAT)

APPLE 2 PLUS or APPLE 2 - 48K with Applesoft in ROM WORKS ON 3.2 OR 3.3 032-0100 \$29.95 (£21.99 inc. VAT)





Apple Version

LABYRINTH OF CRETE

sheet. Skill Level: Moderate

ATARI by Cliff Johnson and Allen Pinero COM. 64 Atari and Commodore Versions by Ralph Jones

This graphic Adventure challenges you to guide Jason and Hercules (yes, TWO characters) through the Labyrinth of Crete to recover the captured golden fleece of Greek myth. Twice as many characters means double the trouble, but don't despair. We've included a complete map of the tri-level labyrinth along with a helpful hint

APPLE 2 PLUS 48K DOS 3.3 042-0162 \$29.95 (£21.99 inc. VAT) ATARI 48K DISK 052-0162 \$29.95 (£21.99 inc. VAT) COMMODORE 64 DISK 192-0162 \$29.95 (£21.99 inc. VAT)

JYYM PEARSON'S **ADVENTURES**

GRAPHICS BY NORMAN SAILER

ADVENTURE PARAMETERS

9	
ADVENTURE PARAMETERS	
Suggested Age Group 12 to Adult	
Game Save Feature Yes	
Graphics Oriented On Apple	
Number of Players 1/Unlimited	





Apple Version

APPLE **ATARI** CoCo **TRS-80**

ESCAPE FROM TRAAM

While on a routine patrol assignment, your small spacecraft's engine fails, forcing you to land on the most hostile planet in the galaxies. No one yet has yet lived to tell the story of Escape From Traam. You can only hope to be the first. Skill Level: Moderate-

Advanced	
TRS-80 16K TAPE Model 1 & 3	140-0109
\$24.95 (£17.99 inc. VAT)	
TRS-80 32K DISK Model 1 & 3	140-0109
\$24.95 (£17.99 inc. VAT)	
*APPLE 48K DOS 3.3 Applesoft ROM	042-0109
\$34.95 (£25.49 inc. VAT)	
ATARI 16K TAPE (Disk Version Below)	140-0109
\$24.95 (£17.99 inc. VAT)	
COLOR COMPUTER 16K TAPE	140-0109
\$24.05 (C17.00 inc. VAT)	

*Apple with full color hi-res pictures!





Apple Version

APPLE **ATARI** CoCo **TRS-80**

THE CURSE OF CROWLEY MANOR

London 1913. You are Inspector Black of Scotland Yard, and though you think you've seen everything in the line of duty — nothing you've ever experienced has prepared you to solve the horrifying mystery of the Curse of Crowley Manor. Skill Level: Moderate-Advanced

TRS-80 16K TAPE Model 1 & 3	140-0108
\$24.95 (£17.99 inc. VAT)	
TRS-80 32K DISK Model 1 & 3	140-0108
\$24.95 (£17.99 inc. VAT)	
*APPLE 48K DOS 3.3 Applesoft ROM	042-0108
\$34.95 (£25.49 inc. VAT)	
ATARI 16K TAPE (Disk Version Below)	140-0108
\$24.95 (£17.99 inc. VAT)	
COLOR COMPUTER 16K TAPE	140-0108
\$24.95 (£17.99 inc. VAT)	
*Apple with full color hi-res pictures!	





Apple Version

APPLE **ATARI** CoCo **TRS-80**

EARTHQUAKE: SAN FRANCISCO 1906
As buildings crumble and the earth opens to swallow what remains, you stumble through the ruins of what was once beautiful San Francisco. Panic-stricken survivors flee around you, but you fear for more than your own life. When the quake hit, you were on your way to Oakland with the ransom for your kidnapped wife. Time is running out ... which way do you go? Skill Level: Moderate-Advanced

Moderate-Advanced		
TRS-80 16K TAPE Model 1 & 3	140-0139	
\$24.95 (£17.99 Inc. VAT)		
TRS-80 32K DISK Model 1 & 3	012-0139	
\$24.95 (£17.99 inc. VAT)		
ATARI 16K TAPE (Disk Version Below)	140-0139	
\$24.95 (£17.99 inc. VAT)		
COLOR COMPUTER 16K TAPÈ	140-0139	
\$24.95 (£17.99 inc. VAT)		
*APPLE 48K DOS 3.3 Applesoft ROM	042-0139	
\$34.94 (£25.49 inc. VAT)		
*Apple with full color hi-res pictures!		d





Atari Version

APPLE ATARI CoCo **TRS-80**

Coauthored by Robyn Pearson

SAIGON: THE FINAL DAYS
Vietnam, 5/75. Crashing through the dense jungle foliage, you hear
the distant fire of the NVA camp guards. You've escaped, but you
have a long way to go before you reach Saigon — if you ever do.
Uncle Sam is pulling out, and Saigon holds your only hope of ever
going home. Gritty realism and historic fact blend to form a unique adventuring experience that plunges you into a controversial

chapter of recent mistory.	
TRS-80 16K TAPE Model 1 & 3	140-0177
\$24.95 (£17.99 Inc. VAT)	
COLOR COMPUTER 16K TAPE	140-0177
\$24.95 (£17.99 inc. VAT)	
ATARI 400/800 16K TAPE	140-0177
\$24.95 (£17.99 inc. VAT)	
*APPLE 48K DISK	042-0177
\$34.95 (£25.49 inc. VAT)	
*Apple with full color bi see pictured	

DVENTURE

TRS-80

THE SLEDGE OF RAHMUL

by Roger Schrag

MERLIN'S TREASURE

by Michael D. Wile

Each Graphic Adventure features an extensive vocabulary, game save, and, with THE SLEDGE OF RAHMUL, real-time game action. During the journey, you will be treated to screen after screen of quality graphics — and THE SLEDGE OF RAHMUL and MERLIN'S TREASURE both feature the kind of game depth and detail that you've come to expect from Adventure International.

Make an investment in fun today — pick up a copy of our latest double feature, THE SLEDGE OF RAHMUL and MERLIN'S TREASURE! No joysticks necessary. Skill Level: Moderate.

(Contains Two Full Disks of Data!) DUMPSIT



TRS-80 Version

TRS-80

SPOOK HOUSE AND TOXIC DUMPSITE

Now your TRS-80 can hobnob with the best of 'em. Over 50 full screens of sharp, quality graphics breathe a realism and vitality into Adventuring, the likes of which you've yet to see on the TRS-80. Both Graphic Adventures feature game save, extensive vocabulary, real-time action (Yes we said real-time!) and accept FULL sentences! Includes two great Adventures: Spook House and Toxic Dumpsite. Skill Level: Moderate.

TRS-80 48K DISK Model 1 & 3 012-0164 \$39.95 (£28.99 inc. VAT) (Contains Two Full Disks of Data!)





TRS-80 Version

TRS-80

THE SEARCH FOR **ELSOLIADO**

by Stefan Schramm

THE SEARCH FOR ELSOLIADO is just that - an interstellar quest for an uncharted world. Since Elsoliado cannot be found by pure chance, information concerning its whereabouts must be purchased from deepspace Starbases - information which frequently sports an exorbitant price tag.

This real-time, strategy-action game features graphics, sound and game save. Average completion time: 6 hours. No joysticks required.

TRS-80 32K DISK 012-0178

\$29.95 (£21.99 inc. VAT)



COM. 64 IBM **TRS-80**

NIGHTWALKER

TRS-80 and COM-64 by Bob Cassady IBM Version by Fran Green

Nightwalker! Beautiful women. Dangerous men. A weird gravedigger. They're all here in this interactive tale that challenges you to gather enough evidence to crack a dangerous underground heroin ring. You must successfully gather enough evidence to present to the police for a bust.

Nightwalker is a text-oriented program that is beefed-up with some sharp graphics routines, and has an extensive data base that assures you of many, many hours of varied excitement - if you survive! For one or more players; includes game save feature.

TRS-80 48K DISK Model 1 & 3 . 012-0149 \$24.95 (£17.99 inc. VAT) 132-0149 \$34.95 (£25.49 inc. VAT) \$24.95 190-0149 (£17.99 inc. VAT) COMMODORE 64 DISK . . 192-0149 \$24.95 (£17.99 inc. VAT)

BATEGI





AIRLINE

TRS-80 Version by Dave Simmons Color Computer Version by Roger Schrag

ATARI CoCo **TRS-80**

Enter the intriguing world of high finance where even the sturdiest of corporate empires can dissolve as quickly as they're built. AIRLINE is a no-holds-barred strategy game for one to four players. The object is to construct a sizable empire while competing against human and/or computerized opponents. Players purchase landing rights from any one of 36 major U.S. cities, buy planes and then station them on routes that will maximize their revenue from fares. And unlike many strategy games, the outcome of AIRLINE is solely determined by your playing skills.

Atari version requires joysticks and a basic cartridge. ATARI 400/800/1200 / COLOR COMPUTER / TRS-80 Model 1&3 16K TAPE 140-0169 \$24.95 (£17.99 inc. VAT)







Atari Version

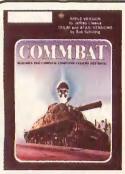
APPLE ATARI COM. 64

Start a WAR on your computer — WAR is a detailed war game for one or two players. Your army consists of armored units, infantry units, engineer units (which can either build or destroy all-important bridges), and aircraft. Set against a backdrop of forests, cities and rivers, you must move your units into battle and eventually destroy your opponent.

WAR comes complete with an extensive instruction manual that outlines all of the strategies and tactics that you'll need to execute a winning game. WAR is certain to provide the avid war gamer with many hours of colorful excitement and action-packed fun. Average completion time 4 hours. Includes game save feature, too!

APPLE 2 48K DISK 102-0150 \$24.95 (£17.99 inc. VAT) (DOS 3.3 Required)

\$24.95 (£17.99 inc. VAT) \$24.95 (£17.99 inc. VAT) \$24.95 (£17.99 inc. VAT)





COMMBAT

by Bob Schilling

Requires 2 **Complete Computers**

APPLE **ATARI TRS-80**

INCLUDED IN THIS PACKAGE - TAPE AND

DISK VERSIONS FOR APPLE, ATARI AND TRS-80 SYSTEMS
Finally! A battle game that allows players on different computer systems to participate. You heard right, different systems! All you need is an APPLE, ATARI or TRS-80 microcomputer, a willing friend with one of the above systems, a full-duplex modem (or, a system of the above system). modem eliminator cable if the two computers are in the same room) and this package!

You and your opponent are located somewhere within a 4096-square-kilometer combat zone. The outcome of the game will be determined by two factors: the skills of the participants and a little luck. Your mission is to find and destroy the enemy's base before he can do the same. Look smart and remember — each enemy tank defeated in combat increases your survival odds.

COMMBAT requires two computer systems with RS-232 port and a 300 baud full

duplex modem. TRS-80 16K TAPE Model 1 & 3 164-0123 \$49.95 (£35.99 inc. VAT)

TRS-80 32K DISK Model 1 & 3 ATARI 24K DISK

ATARI 24K TAPE APPLE 48K DISK DOS 3.3

Package contains one each of the above!

Nominated by Electronic Games Magazine for "1984 Most Innovative Videogame Computer Game"

TILITY

DISKEY

UNLOCK THE SECRETS OF YOUR DISK SYSTEM!

DISKEY is a disk utility that allows you to examine your disks sector by sector, edit and copy files or sectors, and repair crashed disks. DISKEY is now available for the APPLE, ATARI, COMMODORE 64, and TRS-80 COLOR COMPUTER.

ATARI

by Sparky Starks

DISKEY is a remarkable utility program that gives ATARI disk drive owners the flexibility to accomplish tasks that other utilities either ignore or only hint at. With DISKEY, you can actually examine a disk and its directory, and repair files that might otherwise have been lost. DISKEY also performs a multitude of other functions essential to the serious ATARI user.

As an ATARI owner, you have extraordinary power and versatility at your disposal. Tap those resources effectively with DISKEY.

ATARI 400/800/1200 32K DISK 052-0158 \$49.95 (£35.99 inc. VAT) (Note: Some features will require 40K)

TRS-80 Color Computer

by David D. McLeod

If you can only buy one program for your CoCo this year, DISKEY is the one to get! DISKEY is a powerful machine language utility which allows you to examine, modify, or copy almost any disk, sector by sector. DISKEY is designed to help you recover killed files and rescue data from crashed disks. Using DISKEY is also a great way to learn how your disk system operates.

Included with DISKEY is CCDIAG, a diagnostics program which tests all major functions and elements of your Color Computer system.

TRS-80 COLOR COMPUTER 32K DISK 062-0158 \$49.95 (£35.99 inc. VAT)

COMMODORE 64

by Ralph Jones

DISKEY gives your COMMODORE 64 the file-handling capabilities a serious user needs. Many users have complained about the inability of the C64 DOS to copy SEQ or PRG files, or USR files of similar form, from disk to disk. DISKEY gives you not only this, but also the ability to examine, copy, or modify any disk. You can now rescue data from a crashed disk, and recover killed files. DISKEY comes complete with its own DOS.

The user-friendly instructions allow even the novice to use DISKEY quickly and effeciently.

COMMODORE 64 64K DISK 192-0158 \$49.95 (£35.99 inc. VAT)

APPLE

by Scott Smith

Here's a maintenance and repair package that lets you examine and repair your crashed APPLE disks, even if you don't have any special programming knowledge. DISKEY is a complete, menudriven package that includes not only CATALOG EDITOR, DISKEY-COPY, DISKEY-ZAP, and FILE RESURRECTION, but also many other functions that the serious APPLE user will find indispensible.

APPLE II/IIe 32K DISK 042-0158 . . \$49.95 (£35.99 inc. VAT)

ATARI

S.A.G.E.

Scott Adams' Graphics Editor

At last — an excellent graphics editor for ATARI owners! The Scott Adams Graphics Editor allows the user to draw and edit highly compressed (Graphics Mode 7 1/2) pictures using over 50 different colors & shades. This is the same editor developed and used by Scott Adams to create the vibrant graphics in his highly acclaimed S.A.G.A. Series. Here's why you need S.A.G.E.:

★ Drawing speed — pictures load & draw fast!

* Picture Size - many of the pictures created with S.A.G.E. in the S.A.G.A. Series used only 300-400 bytes of memory - clearly an improvement over the "old way" which could eat up 4000-8000 bytes or more to store the same picture!

★ Pictures look identical on both the newer ATARIs (which use the GTIA chip) and the

older models (which use the CTIA chip).

★ S.A.G.E. allows you to place graphics quickly and easily into your own programs.

* S.A.G.E. package includes both tape and disk versions and an easy-to-use manual.

ATARI 400/800/1200 48K TAPE and 48K DISK Both in one package!

054-0166 \$49.95 (£35.99 inc. VAT)





ULTRA DISASSEMBLER

by Ralph Jones

Ultra Disassembler is a superb new utility which enables the user to analyze and modify existing machine language programs. Ultra Disassembler not only directly translates machine language, but also formats the output into highly readable pseudo-source code, including standard system labels where appropriate. Additionally, Ultra Disassembler writes the source code to disk in a form suitable for editing and reassembly with all the major Atari assemblers. Anyone with a working knowledge of 6502 assembly language and the Atari operating system can put Ultra Disassembler to work quickly and effectively.

ATARI 400/800/1200 32K DISK 051-0174 \$49.95 (£35.99 inc. VAT)

APPLE SPICE

by Corey Kosak and David Fox

Apple Spice is a set of fast assembly language routines that alleviate the drudgery of writing programs in Applesoft BASIC. Apple Spice greatly expands Applesoft's capabilities by adding features found in many larger BASICs like, PRINT USING, STRING SEARCH (INSTR)., IF-THEN-ELSE, and LINE INPUT. A complete user-friendly manual includes explanations of the examples found on the disk and shows you how to use Apple Spice.

Whether or not you have machine language skills, you'll find Apple Spice is all you need to extend your Applesoft BASIC.

APPLE 2 DISK 48K ROM APPLESOFT REQUIRED 042-0133 \$29.95 (£21.00 inc. VAT)

BASIC ROUTINES FOR THE ATARI

by Jerry White

Here's a self help system that allows the user to learn effective programming techniques fast! By using the extensive manual in conjunction with the program tape or disk, you'll see just how the actual routines work. Soon you'll be applying these useful subroutines in your own programs. Explore the art of BASIC programming on your Atari with BASIC ROUTINES.

ATARI 400/800/1200 16K TAPE to DISK 051-0154 \$24.95 (£17.99 inc. VAT) ATARI 400/800/1200 24K DISK

052-0154 \$24.95 (£17.99 inc. VAT)

CITES 5



C.R.I.S. ATARI

Cash Register Inventory System

by Scott Adams

"We've used this system in our retail store for over a year now, and it's great"

— Pete Bender, Manager Adventure International Computer Store

The computer age comes to your retail business via C.R.I.S. (Cash Register Inventory System) — a complete software package that will literally convert your ATARI 400, 800 or 1200 into a total point-of-sales terminal. With C.R.I.S., you can perform virtually any of the functions found on standard register systems costing up to 10 times the price. But C.R.I.S. is also a complete inventory control system, too! Information on backorders, total items sold, items in stock, stock ordered, vendor numbers — it's all here and at your fingertips. C.R.I.S. also prints complete inventory reports, including purchase order, stock inventory, end of period, AND it will print customer sales receipts, just like the "Big Machines" do!

If you manage a small business and have ever considered "going computer," now is the time to move up to the finest in point-of-sales and inventory management — now is the time to move up to C.R.I.S.



MAXI MAIL

TRS-80

by Dale Kubler

The **ultimate** in low-cost mail list management is now here — MAXI MAIL, the latest entry in the highly acclaimed MAXI series. MAXI MAIL is a powerful mail list management system that's easy to use and has **totally unlimited storage capacity**. Completely menu-driven and loaded with error trapping routines and safeguards, each MAXI MAIL data disk will hold approximately 1000 names and addresses; you can add as many extra data disks as you like! MAXI MAIL prints address labels, too — up to four across and in any configuration you want. An alignment test ensures that everything is just right before your data printing begins. MAXI MAIL also merges data, supports three numeric codes (of up to four characters each), and offers all of the features necessary for professional mail list management.

ORDER NOW!

TRS-80 48K DISK (2 drives required) Model 3 Only 012-0148 \$99.95 (£71.99 inc. VAT)

MAXI MANAGER II

Maxi Manager has been acclaimed by many as the finest Data Base Management System available for the TRS-80. But it's not any more — because we've just introduced Maxi Manager II! Maxi Manager II is far more powerful and flexible, and even easier to use.

FLEXIBILITY

Maxi Manager II has been designed to serve you, whatever your data management needs. Inventory, mail list management, client records, bibliographies, statistics, professional records, library files, customer data, and more are easily accomodated. Interfield mathematical functions let you perform sophisticated calculations.

In addition, you may change the size of your data base at any time by adding or subtracting fields, or changing field length WITHOUT reentering all your data!

HARD DISK COMPATIBLE

Maxi Manager II is designed to make efficient use of hard disk storage systems, running either the LDOS or DOSPLUS operating system. And because Maxi Manager II allows "named" files, you can store several Data Bases and other files and programs on a single disk (floppy or fixed). Switch quickly from one Data Base to another with a selection from the main menu.

EXPAND YOUR DATA HORIZONS!

Maxi Manager II expands your horizons with up to 60 characters per field and 50 fields per record, for a maximum

DATA BASE MANAGEMENT SYSTEM

by Dale Kubler

record size of 800 characters. The Maxi Manager II data entry video display is user-formatted. Graphics characters can be mixed with text, and you decide where each field appears.

FASTER PROCESSING

Maxi Manager II is much faster than its predecessor. Fullscreen displays, the Multiple Filter Search function, and all other searches are speedier, thanks to new machine language modules. And with the aid of ProSoft's FASTER program, overall speed has been increased by 20 to 30 percent. Finally, the edit function now uses a non-destructive cursor, speeding up your changes.

EASIER ACCESS TO YOUR DATA

New features make printing out reports, labels, and sophisticated "non-form" letters easier. Maxi Manager is now directly compatible with Newscript, Lazy Writer, SuperScripsit, and Scripsit.

In addition, you can now transfer data to VisiCalcTM. Large mailing list users will appreciate the new multiple mailing list module which permits the use of four-up Cheshire labels.

FULL MANUFACTURER SUPPORT

The Business Division stands behind Maxi Manager II with a technical staff ready to assist you, and newsletter is available to keep you informed of enhancements and new products.

TRS-80 Model I, II, or IV (48K, 1 drive required) \$199.95



MAXI ACCOUNTAN

by Bob Gibson

You don't have to be an accountant to use this completely interactive, user-friendly business system! Some of Maxi Accountants powerful features

ACCOUNTS PAYABLE

- Manual petty system supported.
- Check writing with automatic posting to vendors and bank accounts.
- Enter A/P invoices with automatic posting to inventory and purchase orders.
- Supports partial payments, aged A/P balances and earned discounts.
- Monthly check, deposit & petty cash register.

INTERACTIVE GENERAL LEDGER

- Automatic posting, complete audit trail.
- Asset depreciation, complete G/L reports: daily journal, trial balance, operating and balance sheet.

PAYROLL

- · Only requires input of hours worked.
- Automatic calculations of pay and deductions.
- Weekly, bi-weekly, monthly, or bi-monthly periods.
- Keeps complete QTR and YTD pay journal records and prints YTD info on check stubs and all reports.
- Handles hourly, salaried and commission employees.

INVENTORY CONTROL

- Provides ON LINE information to all other modules.
- Purchase orders with review or automatic ordering
- Back ordering system included.

- 25 items per bill-of-material.
- 1700 stock items per diskette with automatic advance-
- Sales analysis, stock labels + more.
- Stock status.

ACCOUNTS RECEIVABLE

- Prices quotation & leads file.
- Sales orders with packing slips.
- Invoices from sales orders support back ordering system.
- Invoices for point-of-sale.
- Multiple discounts and tax rates.
- Alphabetical sorting of customers.
- Supports partial payments, finance charges, aged balances, statements.
- 500 customers and 3000 transactions per diskette.

Maxi Accountant has been extensively field tested, and Maxi Accountant can be successfully applied by many small to mid-sized DISTRIBUTION or MANUFACTURING companies and by most RETAIL or mail order SALES companies to satisfy nearly ALL the requirements for data processing IN HOUSE.

Maxi Accountant IBM requires MS-DOS, 128K RAM, and 2 320K Drives or Fixed Drive and Printer.

Maxi Accountant is designed for MS-DOS systems, including IBM PC and XT, Zenith Z-100, Victor 9000, Texas Instruments PC, Columbia, Compaq, Hyperion, Corona, Eagle PC, and Rainbow 100.

132-0220



MAXICRAS by Dale Kubler

CP/M **IBM KAYPRO OSBORNE TRS-80**

What is Maxi CRAS?

Maxi CRAS (Check Register Accounting System) is a computerized check writing and recording system for personal or small business use.

It takes the work out of printing checks, balancing your account, and reconciling it with bank statements. And that's only the beginning!

Who can use it?

Maxi CRAS is powerful enough for small businesses, and easy enough to handle for family or personal use. Best of all, it won't make you change the way you do business. Write checks by hand and enter them into the computer later, or let Maxi CRAS do all the work, and print checks automatically.

I'm interested. Tell me more!

Organizing the data is just half the picture, Maxi CRAS provides six essential reports and statements in a fraction of the time required to do them by hand. At tax time, you'll have all the data you need at your fingertips. No more sifting through shoeboxes full of cancelled checks!

Spread Sheet Analysis

For detailed forecasting and budgeting. Maxi CRAS interfaces with electronic spreadsheet programs like VisiCalcTM and SuperCalcTM.

They Liked It!

"We never thought we'd see the day, but here it is. We have published a review of a check register program that made us want

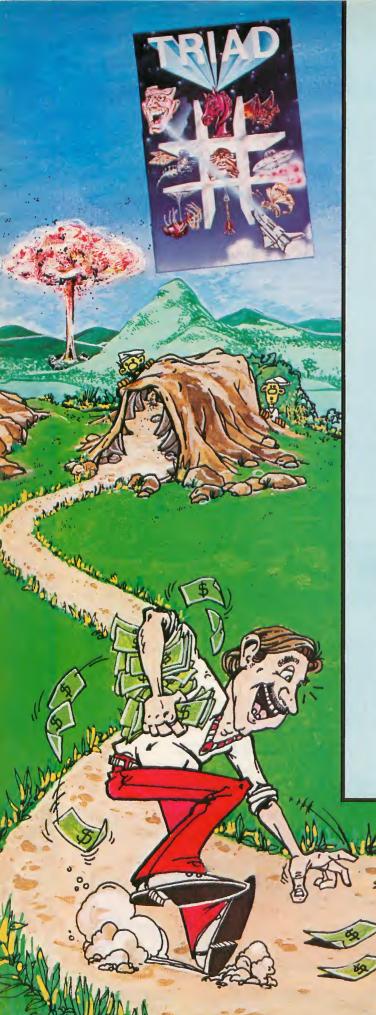
Reprinted from a review of Maxi CRAS in the February 1983 issue of Creative Computing magazine. Copyright 1983 Ahl Publishing Company.

Check out these features!

- Write checks by hand, or print automatically on single or continuous form checks (NEBS 9020).
- Data Entry routine second to none saves time AND eliminates errors. You don't need to be a computer expert to use Maxi CRAS.
- The best selection of printed reports available complete check register, income and expense subtotals, bank statement reconciliation, list of check register notes, and an account distribution statement. Compare!
- Checkbook balance is constantly updated and instantly accessible. No more embarrassing overdrafts!
- A notes option can be used to flag tax-deductible transactions.
- Handles up to 223 user-defined income and expense accounts. Many other systems only allow ONE income account. Compare!
- Assign transactions to a single account, or distribute over multiple accounts. Assign specific amounts, or pro-rate by fraction or percentage. Cash transactions can be recorded in any account without affecting check-book balance.
- Check Address data base stores up to 75 addresses and automatically prints them on your checks.
- Fast and easy bank statement reconciliation.
- Maxi CRAS is supplied with a complete User's Manual, and sample printouts.

HARD-DISK COMPATIBLE!

CP/M · 8 inch disk
IBM PC & XT (2 drives, 80 column display required)
Osborne/ Kaypro (2 drives, 80 column display required)
TRS-80 Model I, III, or IV (48K, 2 drives required)
TRS-80 Model II, 12, 16 122-0145 132-0145 182-0145 \$99.95 \$99.95 \$99.95 (£71.99 inc. VAT) (£71.99 inc. VAT) (£71.99 inc. VAT) (£71.99 inc. VAT)



TRIAD

by Ed Hobbs

Color Computer Version by Jeff Francis

APPLE 2 ATARI COM. 64 CoCo

The imaginative game scenario centers around a master tic-tac-toe board. Score an "X" by selecting and successfully battling one of nine weird foes. Three X's in a row and Bingo! — you automatically advance to the next level! But the core of TRIAD is the colorful hi-resolution graphics and great sounds. They simply have to be experienced firsthand!

TRIAD excells in the "frills department," too — keyboard or joystick option, game freeze, running high score and more. And a succession of teeth-gritting skill levels is guaranteed to test the eye-to-hand coordination of the most valiant of armchair warriors. Joystick required on Commodore version.

APPLE 2 DOS 3.3 Required Flippy Disk 48K ATARI 400/800 102-0173 \$34.95 (£25.49 inc. VAT)

COMMODORE 64 TAPE AVAILABLE DIRECT FROM COMMODORE COMMODORE 64 DISK AVAILABLE DIRECT FROM COMMODORE COLOR COMPUTER 32K TAPE ... 060-0173 \$34.95 (£25.49 inc. VAT)

APPLE 2

GNOME VALLEY

by Roger Maine

Technology meets geology in GNOME VALLEY, a colorful, graphicsoriented game for your APPLE that looks as though it could've popped right out of the arcade! You are challenged to enter a mysterious cave and defuse a deadly hydrogen bomb. And hordes of crafty gnomes are out in force to ensure that you don't!

Sharp, intricate graphics and sounds ensure that GNOME VALLEY will find a permanent place on your software library's shelf of favorites. Joystick not required, but recommended! For one or two players.

APPLE 2 48K DOS 3.3 042-0219 \$34.95 (£25.49 inc. VAT)

C'EST LA VIE

APPLE ATARI COM. 64

by Gordon Eastman

It's a dream come true! The streets are litered with \$10, \$20 and \$50 bills, and you're challenged to collect as many bucks as you can. But there are flies in this financial ointment — thieves and tax men abound. A loan from your friendly neighborhood loan shark may tide you over, but you'd better repay him on time or else!

Great graphics and sounds. For one or two players. Joystick optional.

APPLE 2 48K DISK DOS 3.3 042-0218 \$34.95 (£25.49 inc. VAT) ATARI 48K DISK..... (£25.49 inc. VAT) 052-0218 \$34.95 ATARI 48K TAPE... 050-0218 \$34.95 (£25.49 inc. VAT) 192-0218 \$34.95 (£25.49 inc. VAT) 190-0218 \$34.95 (£25.49 inc. VAT)

Adventure

A DIVISION OF SCOTT ADAMS, INC. BOX 3435, LONGWOOD, FL 32750 • (305) 862-6917



- Professional, low profile, finished appearance.
- U.S. made—high quality, quad gold contacts.Smooth "Touch Typist" feel—no sagging.

- Original key layout.
 No soldering—fast, simple installation.
 No special software required.
- Individually boxed with full instructions.
- Only \$69.95.

AT YOUR FAVORITE DEALER OR DIRECT FROM

*Computers produced after approximately October 1982 require an additional keyboard plug adapter. Please add \$4.95.



ALL ORDERS: Please add \$2.00 shipping and handling in the Continental U.S. All others add air shipping and \$3.00 handling. California residents add 6% sales tax. Foreign orders please remit U.S. funds. We accept VISA and MasterCard.

♠ from page 85 550 FOR C=LA TO A STEP 30 560 CLOAD*A,A\$ 565 FOR P=0 TO 29 566 IFA(P)=1000THEN590 570 POKE C+P, A(P) 575 NEXT P 580 NEXT C 590 RETURN 600 PRINT"EXECUTION ADDRESS";:GO SUB800 605 IFM=1THENRETURN 610 EXEC A 620 RETURN 700 END 800 M=0: INPUTAS 805 IFA\$="P"THENPP=1-PP:GOTO800 810 IFA\$="M"THENM=1 820 IFA\$=""THENA=0:RETURN 830 IFLEFT\$(A\$,1)<>"\$"THENA=VAL(A\$):RETURN 840 A = MID (A , 2)850 A=0:B=1 860 IFRIGHT\$(A\$,1)>="A"THENV=ASC (RIGHT\$(A\$,1))-55:GOTO870 865 V=VAL(RIGHT\$(A\$,1)) 870 A=A+V*B:B=B*16 880 A\$=LEFT\$(A\$,LEN(A\$)-1) 890 IFA\$=""THENA\$="\$":RETURN 895 GOTO860 900 B=4096:C=A/B:D=INT(C)910 E=D*B:F=A-E:G=256:H=F/G:I=INT(H) 920 J=I*G:K=F-J:L=16:M=K/L:N=INT (M) 930 O=N*L:P=K-O:Q=INT(P)940 PRINTMID\$(H\$,D+1,1);MID\$(H\$, I+1,1);MID\$(H\$,N+1,1);MID\$(H\$,Q+ 1,1);" "; 945 IFPP=1THENLPRINTMID\$(H\$,D+1, 1);MID\$(H\$,I+1,1);MID\$(H\$,N+1,1) ;MID\$(H\$,Q+1,1);" "; 950 RETURN 1000 CLEAR200, 20430 1010 FORC=20443TO20478 1020 READA\$:GOSUB850 1030 POKEC, A 1040 ENDC 1050 GOTO15 1060 DATA CE, 40,00, FF, 4F, D7, CE, 0 0,00, FF, 4F, D9, FE, 4F, D9, A6, 00, 08, FF, 4F, D9, FE, 4F, D7, A7, 00, 08, FF, 4F ,D7,8C,42,00,26,E9,39

NEW PROFIT OPPORTUNITY for COMPUTER RETAILERS!

If you sell TRS-80 hardware or software, you should be selling **THE COLOR COMPUTER MAGAZINE** and **PORTABLE 100** in your store.

It's easy, it's profitable and it's risk free!

- PROFITABLE 40% of every sale is yours. You keep \$1.18 of the \$2.95 cover price!
- NO RISK guaranteed return policy. You pay only for copies you sell.
- FREE SHIPPING 12 times a year, magazines arrive at your store at no cost to you!
- FREE DISPLAY RACK shipped with your initial order.

To place your order for one or both magazines, or to receive more information, call Marian at (207) 236-9621 today!

Or write:

COMPUTER PUBLISHING COMPANY Highland Mill • Camden, ME 04843 Publisher of



Computer___





Air Traffic Controller is a computer model of an air traffic control situation in which Remotely Piloted Vehicles (RPV's) are operated by the controller in landing on and taking off from designated runways.

32K Extended Basic

TAPE 28.95

DISK 31.95

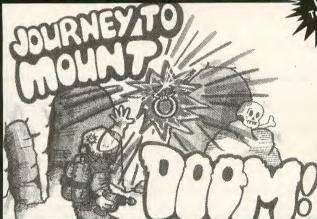


Devil Assault is a mult-level multi-BY screen game in which bird-like creatures, robots and the devil himself assault your home base which you must defend.

16K Machine Language

TAPE 27.95

DISK 30.95



The Necromancer is about to wage war on earth. He needs his lost gold ring to acquire the power to do so. You must find the ring, take it to Mt. Doom and destroy it in the flames from which it came, thus elminating the Necromancer's evil powers.

32K Machine Language

DISK ONLY 27.95



Arcade Action. Method of play you are the Grabber. The object is to grab the 8 treasures and store them in the center boxes. You start with 3 Grabbers and get extra ones at 20,000 points. Watch out for the googlies! Super high resolution graphics.

32K Machine Language

TAPE 27.95

DISK 30.95



TOM MIX SOFTWARE

3424 COLLEGE N.E. GRAND RAPIDS, MI 49505 To Order Call 364-4791
To Place Orders After 5:00 P.M.
Call Our BBS At
(616)364-8217

•ADD \$1.00 POSTAGE & HANDLING•TOP ROYALTIES PAID•
•MICHIGAN RESIDENTS ADD 4% SALES TAX•
LOOKING FOR NEW SOFTWARE



ARCADE ACTION GAMES

VISA*

130 GOTO 20

200 PRINT"START ADDRESS OF BLOCK

";:GOSUB800

205 IFM=1THENRETURN

210 POKE 20450, INT(A/256)

220 POKE20451, A-INT(A/256) * 256

230 EXEC 20443

240 A\$=INKEY\$:IFA\$=""THEN240

250 IFA\$="W"THENA=A-512

260 IFA\$="Z"THENA=A+512

270 IFA\$="M"THENRETURN

280 GOTO210

300 PRINT"START ADDRESS";: GOSUB8

00: IFM=1THENRETURN

310 CC=A

320 A=CC:GOSUB900:A=PEEK(CC):GOS

UB900:PRINTCHR\$(PEEK(CC));" ";:G

OSUBBOO

325 IFPP=1THENLPRINTCHR\$(PEEK(CC

))

330 IFM=1THENRETURN

340 IFA\$=""THEN360

350 POKECC, A

360 CC=CC+1:GOTO320

400 PRINT"START ADDRESS";: GOSUB8

00:SA=A

405 IFM=1THENRETURN

410 PRINT"END ADDRESS";: GOSUB800

:EA=A

415 IFM=1THENRETURN

420 PRINT"READY TAPE RECORDER AN

D PRESS <ENTER>"

430 INPUT A\$

435 IFA\$="M"THENRETURN

440 FOR C=SA TO EA STEP 30

445 FOR P=0 TO 29

450 A(P) = PEEK(C+P)

455 NEXT P

460 CSAVE*A, A\$

470 NEXT C

475 A(0)=1000

476 CSAVE*A, A\$

480 RETURN

500 PRINT"LOAD ADDRESS";: GOSUB80

0: LA = A

505 IFM=1THENRETURN

510 PRINT"END ADDRESS";: GOSUB800

515 IFA\$=""THENA=65535

520 IFM=1THENRETURN

530 PRINT"READY TAPE RECORDER AN

D PRESS <ENTER>"

540 INPUTA\$

545 IFA\$="M"THENRETURN

♦ to page 87

YOUR TRS-80* SPECIALISTS IN CANADA



SOFTWARE FROM
ADVENTURE INTERNATIONAL
COMPUTERWARE
TOM MIX

MED SYSTEMS SPECTRAL

PRICKLEY PEAR
PROGRAMMERS GUILD

COGNITEC
PRISM
DATASOFT

AND MORE

DISK DRIVES
EPSON PRINTERS
MARK DATA KEYBOARD KITS
WICO & KRAFT JOYSTICKS

BOOKS & MAGAZINES

VISA & MASTER CARD ACCEPTED

WRITE OR PHONE FOR A FREE CATALOGUE

CMD MICRO

COMPUTER SERVICES LTD.

10447 - 124 STREET EDMONTON, ALBERTA T5N 1R7 PHONE 403 - 488-7109

*TRS-80 IS A TRADEMARK OF TANDY CORP.

Circle No. 60 on Reader Service Card

Software

From Preschool to College

PreReader - \$19.95; Disk \$24.95

For ages 3-5. Drills reading readiness skills and hand-eye coordination. Great graphics and music. 32K Ext. Basic, Joysticks, Disk Compatible.

Galactic Hangman - \$17.95

For grade 2 and up. Outstanding high-res graphics and sound effects add an exciting twist to this word guessing game. Play against the computer or use your own word list. 16K and 32K versions, Ext. Basic, Disk Compatible.

Great USA - \$19.95

For grade 4 and up. Learn states, capitals, abbrev., flowers, birds, nicknames. Easy user input routines. 16K and 32K versions, Ext. Basic, Disk Compatible.

Silly Syntax - \$19.95; Disk with 62 Stories \$49.95

For grades 5 and up. Your student will want to be first to supply the nouns, verbs, adjectives and adverbs needed to complete these hilarious stories. Requires 16K Ext. Basic.

Statgraf - \$24.95; Disk \$29.95

For grades 10 and up. Your advanced math and science students can plot their data with this sophistocated high resolution plotting/line graphing system combined with a linear regression analysis package. *Requires 32K Ext. Basic. Disk Compatible*.



SUGAR SOFTWARE 2153 Leah Lane Dept. C Reynoldsburg, Ohio 43068 (814) 861-0565 Cts orders EMAIL to 70405, 1374

Add \$1 00 per tape or disk for postage and handling. Ohioans add 5.5% sales fax. COD orders are welcome. Daster inquiries invited.

COMPUTIZE INC. PRESENTS. . . The **BEST** in Coco Backup Utilities

"SPIT-N-IMAGE" (C)

M/L DISK BACKUP UTILITY

Tired of spending-all those \$\$\$\$ for that Disk Software that you can use and not Backup???? Then "SPIT-N-IMAGE" is for you. Creates a Mirror Image of Most popular Diskettes which do not respond to normal Backup functions. "SPIT-N-IMAGE" also initializes and Backs-up standard Diskettes in one pass.

Requires 32k CC and 1 or 2 Disk Drives Supplied on

===> NON-PROTECTED MEDIUM <=== Cassette \$24.95 - Diskette \$29.25

"TAPE-N-IMAGE" (C)

M/L CASSETTE BACKUP UTILITY

Frustrated at not being able to Backup your valuable Cassette Based Software???Then "TAPE-N-IMAGE" is for you. It creates a Mirror Image of Most popular Cassette Software -M/L, Basic and Data - that do not respond to normal Backup functions.

Supplied on

===> NON-PROTECTED MEDIUM <===

Requires 16k or 32k CC

\$9.95

COMPUTIZE INC. P.O. BOX 207 LANGHORNE, PA 19047 215-946-7260





Add \$2.00 Shipping PA Res. add 6% sales tax

DEALER INOUIRIES WELCOME

Circle No. 58 on Reader Service Card



KEYBOARD HELPS FAMILIARIZE CHILDREN WITH THE LOCATION OF COMPUTER KEYS. THE GRAPHIC KEYBOARD ENABLES THE USER TO FIND KEYS QUICKLY. HOME KEYS ARE IDENTIFIED AND PROPER FIN-FIND KEYS QUICKLY. HOME KEYS ARE IDENTIFIED AND PROPER FINGERING MAY BE TAUGHT TO OLDER CHILDREN. LESSONS ARE BUILT AROUND ALPHABET PRESENTATIONS AND LETTER DRILLS WITH A GRAPHIC REWARD COMPLETING EACH LESSON. WHILE YOUNG CHILDREN ENJOY KEYBOARD'S LETTER RECOGNITION ACTIVITIES, ADULTS MAY BRUSH UP ON RUSTY TYPING SKILLS. THE 32K VERSION HAS LENGTHIER TIMED DRILLS. DATA TAPE USE IS OPTIONAL WITH BOTH 16K AND 32K VERSIONS. ANY DATA TAPE MADE FOR BS'S SPELLING OR HANGWORD/SCRAMBLE PROGRAMS MAY BE USED WITH KEYBOARD, OR USE KEYBOARD PHONIC DRILL DATA TAPE. (SEE BELOW) 16K Cassette - \$19.95 / 32K Cassette - \$24.95 / 32K Disk - \$26.95

KEYBOARD Phonic Drill Data Tape - \$8.95

INTEGRATE LEARNING WITH USE OF THIS DATA TAPE AND KEYBOARD PROGRAM. STUDENTS TYPE LETTER, WORD, AND SENTENCE DRILLS USING COMMON VOWEL AND CONSONANT COMBINATIONS. REINFORCE PHONIC STRUCTURES WHILE LEARNING THE KEYBOARD, MUST BE USED WITH KEYBOARD PROGRAM (ABOVE). MAY NOT BE USED ALONE.

For use with TRS-80 Color Computer* & TDP-100* with Extended Basic

ASK FOR DEALER DEMONSTRATION TODAY!

Brochure describing other fine B5 programs available upon request.

*Reg. trademark Tandy Corp. If unavailable locally,

order direct. (OH Res. odd

fware DEPT. M 1024 Bainbridge Pl. Columbus, Ohio 43228 (614) 276-2752

Table 1. Memory Locations and ROM Routines

\$F83F	FLSCUR	Flash the cursor at the current cursor position.
\$F883	POLCAT	Pole the keyboard and return the key being pressed
		to the A accumulator.
\$F9C6	CHROUT	Output a character from the A accumulator to the device
4.000		pointed to by DEVNUM.
\$F9D0	LPTOUT	Output the A accumulator to the printer.
\$FA1B	SCNOUT	Output the A accumulator to the screen.
\$FAAF	INPLIN	Input a line of text from the keyboard.
\$FBD4	CLS	Clear the text screen.
\$FBD6	CLSB	Clear the screen with the contents of the B
4.550	01.00	accumulator.
\$0003		Bit 0 is serial out, bit 2 is serial in.
\$00E8	DEVNUM	Device number.
\$4224	BAUD	Baud:
, , , ,	5,100	\$F0 = 300 bps
		\$76 = 600 bps
		\$3C = 1200 bps
		\$19 = 2400 bps
		\$0A = 4800 bps
\$0093-\$0094		Points to start of Basic
\$0095-\$0096		Points to start of variables.
\$009B-\$009C		Points to top of stack.
\$00A1-\$00A2		Points to top of user RAM.
\$00AD-\$00AE		Points to next line of Basic program,
\$00EA		Reset flag.
\$421F-\$4220		Jump for EXEC.
\$4280-\$4281		Position of cursor.
\$4229		Printer width.
\$4231-\$4236		Keyboard look-up table.
\$4282		Cursor character.

Program Listing 1. MC-10 Basic Monitor

10 REM 1983 BY DOUG KELLEY

12 'GOSUB1000

15 H\$="0123456789ABCDEF"

17 DIMA(30)

20 CLS:PRINT@7, "MICRO MONITOR 1.

0";

30 PRINT@131,"1) EXAMINE/CHANGE

MEMORY";

40 PRINT@163,"2) DISPLAY A MEMO

RY BLOCK";

50 PRINT@195,"3) SAVE A BLOCK O

F MEMORY";

60 PRINT@227,"4) LOAD A BLOCK O

F MEMORY";

EXECUTE A PROG

70 PRINT@259,"5)

RAM";

80 PRINT@291,"6) END PROGRAM";

90 PRINT@360, "ENTER SELECTION";

100 A\$=INKEY\$:IF A\$=""THEN100

110 IF A\$<"1"OR A\$>"6"THEN SOUND 1,1:GOSUB100

115 CLS

120 ON VAL(A\$)GOSUB300,200,400,5 00,600,700

My MC-10 Speaks ML!

Machine language on the MC-10? What won't this little machine do?



by Tim McFadden and Doug Kelley



N OUR LAST ARTICLE on the MC-10 we described its features and performance; this time we want to show you how to program in machine language, using a simple Basic monitor program (Program Listing 1). To run the program, type it into the MC-10, save it to tape, then Run it.

When the program is Run, a main menu will appear at the top of the screen. To select any one of the options, press the number corresponding to your choice. When you want to finish the program, press number six to return to the Basic command mode.

If you press number one you will enter the Memory Examine and Modify section. The computer will respond with the prompt START ADDRESS?, to which you respond by entering the number, either in hex or decimal, you wish to start examining. (For a decimal number, simply enter that number, for a hex number, use the prefix \$.)

If at any time during the program you wish to return to the main menu, press M followed by pressing Enter. After you have entered your start address the computer will respond with the hex address; the contents of the location in hex; the ASCII symbol for the number in memory (if there is one); and will then prompt you for a response. You may either press Enter to indicate no change, or the number to which you wish to change the contents. As always, entering an M will return you to the menu, and a P will toggle the printer on/off switch.

Pressing number two, while in the main menu, will put the program into a

Memory Block Display mode. The computer will ask you what memory location you want to examine, and you may respond with the decimal or the hex value. Again, as always, you may press M or P. The screen will immediately fill, starting with your location on the top left of the screen. The display will continue to update until the letter M is pressed.

To advance to the next page of memory, press the Z key, and to go to the previous page of memory, press W. Notice the Up and Down Arrows on the W and Z keys, to help you remember which key pages in which direction.

Memory Blocks

Since the MC-10 has no built-in CSAVEM command, the monitor lets you save a block of memory to cassette tape. To enter this mode, press the numeral three key, and the computer will ask you the start address of your data. Respond with the hex or decimal location, or the P or M keys. Do the same for the END ADDRESS? prompt. The computer will next tell you to ready the cassette recorder and press Enter. If you wish to name your file, do so before you press the Enter key. The computer will save the block of memory, then return you to the main menu.

Loading a block of memory is done by pressing the numeral four key. The computer will respond with: LOAD ADDRESS?; you should answer as you did for the START ADDRESS? prompt in the Save mode. The computer will then ask for the ending address of the data. If you hit the Enter key, the computer will load the entire block of memory from cassette, but if you Enter an address, the computer will load only to that address. The Load address does not have to correspond to the Save address, creating an additional block move feature. The computer will once again ask you to set up the tape recorder and press Enter. If you do not specify a file name, the computer will load the next section of data on the cas-

Executing a program in memory is done by pressing the numeral five key. The computer will present a prompt: EXECUTION ADDRESS?, to which you should respond with the address of the memory location to which you wish to transfer control.

To aid in your programming efforts, here are some useful undocumented ROM routines found in the Micro Color Basic Interpreter. Also included in Table 1 are some memory locations you may find useful.

Programs



IS AVAILABLE AT SOFTWARE RETAILERS EVERYWHERE. IF YOUR LOCAL COMPUTER OR SOFTWARE STORE DOES NOT CARRY IT — ASK THEM WHY NOT. SEND ONE DOLLAR FOR ILLUSTRATED CATALOG. DEALER INQUIRES INVITED.

HOURS OF FUN AND ENJOYMENT FROM THE "ADVENTURE PLACE"

TO ORDER: SEND AMOUNT INDICATED PLUS \$2.00 SHIPPING, PER ORDER. INCLUDE STOCK NUMBER, QUANTITY DESIRED AND YOUR PREFERENCE OF TAPE OR DISK. BE SURE TO INDICATE TYPE OF SYSTEM, AMOUNT OF MEMORY, ETC. WHEN USING CHARGE CARD TO ORDER BY MAIL, BE SURE TO INCLUDE EXPIRATION DATE.



CHARGE CARDS WELCOME



1-800-624-4327 PHONE ORDERS ACCEPTED 8:00 A.M. TO 8:00 P.M. E.S.T. MON-FRI

AARDVARK Action Software

2352 S. COMMERCE RD. WALLED LAKE, MI 48088 313/669-3110



UTILITIES

COLORKIT: What can we say about the absolute best stateof-the-art programmer's utility. This program adds 35 commands to BASIC that should have been there all along and no short description will do it justice. Summary - light

or dark screen, keyclick, screen editor, programable keys, a super memory tool, variable listing, echo to printer, BREAK disable, convert machine language to DATA, global search, single step thru program run, double space printouts of program listings - that's less than half of what it will do. It takes about 6K of space, and if you have 64K you can put it up high and lose no BASIC space at all. 100% ML. Fully relocatable. Tape - \$34.95, Disk - \$39.95



PRICKLY-PEAR MAILING LIST: This mailing list program will handle up to 1500 records per file and will sort by name or zip code. It searches on any field and all display is in a hiresupper and lower case format. There is no better mail list program. Needs 32K and 1 disk drive. B & ML. \$49.95

MUSIC BOX: Compose your music in 4 voices and let the harmony flow. You can assign any of 4 instruments to each voice, and the program is truly easy to use. 100% ML. Tape -\$24.95

EIGHT-BIT BARTENDER: Over 100 drink recipes, and you can call them up by name, category, or main liquor. The author's liver risked death to bring you this program. Needs 32K. B & ML. Tape - \$19.95, Disk - \$24.95

HOUSEHOLD HELPER: This gem does recipe conversions, metric conversions, gasoline computations, and maintains a bills due file. A very friendly program. B & ML. Tape -\$19.95, Disk - \$24.95

NEWE SUPER ASTROLOGY: Everything our customers have written and asked for in an astrology program is here! This all new program by a new author gives accuracy to a few minutes of arc. Choose from tropical or sideral zodiacs, Heliocentric or Geocentric, and five different house systems - Placidus, Campanus, Regiomontanus, Koch, and Equal. Specify the orb for aspects, find any harmonic, and output the complete natal horoscope to the screen or printer. The program will handle progressed and transit charts with date manipulation. This program comes with complete and easy to follow instructions, sample chart forms, and a suggested reading list to aid in interpretation. Don't settle for a lesser program! Needs 32 K. B & ML. Tape - \$24.95, Disk -\$29.95

EXPLANATION OF CODES

BASIC: This program is 100% BASIC. That means it is easy to examine and easy to modify. BASIC is the best language for some applications.

B & ML. This program is written mostly in BASIC, but some routines are in machine language for more speed. May be harder to examine or modify than an all BASIC program.

100% ML. This program is all machine language for fastest possible execution. Examination or modification will require a high skill level.

Programs are available on AMDEK cartridges - add \$5.00 to the disk price.

Your personal check is welcome - no delay. Include \$1.50 shipping for each program ordered. (Shipping free on \$50.00 or larger orders). AZ residents add 7% sales tax. Orders shipped within two days.

EDUCATIONAL PROGRAMS

PREREAD I, II, & III: This program uses graphics and voice from the tape to teach the alphabet three ways - by name, by sound, and by shape. B & ML. Tape - \$24.95, Disk (with voice tapes) - \$29.95

PHONICS I: Teaches all the consonant blends phonetically, using graphics and sound from the tape. B & ML. Tape - \$24.95

PHONICS II: Like Phonics I, but teaches the consonant digraphs. B & ML. Tape - \$24.95

PHONICS I & II ON DISK: A package that includes both of the above in a disk format. Still has voice on tape. B & ML. Disk only (with voice tapes) - \$44.95

SPELLING:

NEW Six tapes provide voice testing and practice modes for the entire 220 word Dolch list which makes up 75% of all elementary written material. Eleven lessons, and the testing is by VOICE, just like in class. The disk version can be easily modified to include new words. B & ML. Tape -\$49.95, Disk (with voice tapes) - \$54.95

MATHPAC: Provides drill and positive reinforcement of addition, subtraction, multiplication, or division. Lots of extras for repeating, setting levels, and classroom use. Tape - \$19.95, Disk - \$24.95

DISK UTILITIES



OMNI CLONE: This program even amazes us. It backs up every color computer disk we have seen, and has even backed up disks for the Model 3 and IBM PC. Protect your valuable collection against loss with this super power backup utility. Easy to use. Needs 32K and at least one disk drive, but

works with two drives if you have them. 100% ML. \$39.95

DISK ZAPPER: A neat utility that lets you easily examine and change data right on the disk! Rebuild directories, format to 40 tracks, change programs, store backup directories, and more. Needs two drives and 64K for some functions. B & ML. \$34.95



DISK MANAGER: If you have an extensive software collection, this program will create an alphabetical listing so you can find what you want. It also prints a super directory with ML addresses and gives you three ways to recover a crashed disk! Needs 32K and 1 disk drive. B & ML. \$29.95

DISK MASTER: Eight functions, including drive speed check and adjust, moving DATA files to and from disk and tape, a directory which includes ML addresses, two different disk maps, and an easy mass copy utility. Needs one disk drive and 32K. B & ML. \$24.95

PUBLICATIONS

SONGBOOK: The PLAY statements and lyrics for over 200 songs. Type them in and just listen, or use them in your own programs. Hymns, popular songs, fold songs, college marches, holiday songs, and lots more. About 100 pages, soft cover, plastic ring binder. \$9.95 - quantities limited.

Stocked by Quality Dealers, or

Send Order To: PRICKLY-PEAR SOFTWEAR



9234 E. 30th Street Tucson, Arizona 85710 (602) 886-1505





PRICKLY-PEAR SOFTWARE

QUALITY PROGRAMS FOR YOUR COCO & TDP-100

PROGRAMS REQUIRE 16K EXTENDED BASIC FOR TAPE, AND 32K DISK UNLESS OTHERWISE NOTED.

SIMULATION GAMES



VIKING: Run your country well and become king or queen. This is the most complex simulation we've seen. Takes 2 or more hours, has 9 levels, and is for 1 to 4 players, B & ML. Tape -\$19.95, Disk - \$24.95

GANGBUSTERS: Start as a punk and manage your criminal empire to become syndicate boss. Steal, make hits on the other players, go to prison, and lots more fun. 2 to 6 players. B & ML.

Tape - \$19.95. Disk - \$24.95



FOOTBALL: A strategy approach. Offense and defense choose their plays, and the results are calculated by past averages and some chance. Truly a football lovers simulation. B & ML. Tape - \$19.95, Disk - \$24.95

SIMULATIONS

FLIGHT: Not a game, but a hi-res graphic landing simulator. Choose 4 levels of instrument or regular landings, with or without crosswinds. Needs 32K. B & ML. Tape · \$19.95, Disk - \$24.95



FANTASY GAMING **APPLICATIONS**

(These are not games)

FANTASY GAMER'S PACKAGE: All versions have a 20 page manual and display hi-res rooms and roll complete stats for characters and monsters. 32K version also has a dicebag for instant dice simulations in 36 ranges. Disk version has dicebag and complete dragon and ring rollers. B & ML. Tape - 16K \$19.95, 32K \$24.95; Disk - \$29.95

FANTASY MASTER'S SECRETARY: For use during play, this will easily keep track of characters, monsters, time, treasure, magic, and more. B & ML. Tape - \$19.95, Disk - \$24.95

ADVENTURE

ADVENTURE IN WONDERLAND: Simply the best adventure ever written for the color computer. A full Eliza intelligence so you can enter whole sentences. At least three ways out of any trap. A vocabulary of HUNDREDS of words. Needs 32K. 100% ML. Tape - \$24.95, Disk - \$29.95

WORD GAMES

THE GREAT WORD GAME: 2 to 4 players compete using words they have chosen. Each player tries to guess the opponents' words while the opponents do the same. B & ML. Tape - \$19.95, Disk - \$24.95

TOPSY TURVY: Race against the clock to form as many words as possible from the letters you are given. Lots of bonus scoring for longer words. BASIC. Tape - \$19.95, Disk - \$24.95

DECIPHER:

NEWE For 1 or more players. Multiple players choose their words, while single players let the computer choose from hundreds stored in memory. You must unscramble the word or phase while the clock runs. This is the best available word game! 100% ML. Tape \$24.95, Disk -\$29.95

JOYSTICK GAMES

TEEEOFFF: The only really outstanding golf game for the color computer. All in hi-res, and you move your golfer (a little person) up to the ball and then control his backswing with the fire button. Very challenging, with water and sandeven giant cactuses. 1 to 4 players. 100% ML. Tape -\$24.95, Disk - \$29.95

SHAFT: The ultimate in "dodge the moving object" games. Really tough, with 15 screen patterns to learn and ascending difficulty, 100% ML. Tape - \$24.95, Disk - \$29.95

MISCELLANEOUS GAMES

MONSTERS & MAGIC: Fight your way thru up to 50 different monsters using a realistic fantasy combat system (initiative - damage by weapon type - levels - etc.), and then try to defeat the dungeon lord. 1000+ place description combinations. For 1 player, needs 32K. BASIC. Tape -\$19.95, Disk - \$24.95

JUNGLE: Take a journey into trouble. This game gives Murphy's law new meaning, and in this magical jungle, many things are only illusions. A very nice game, and easy enough for the younger set. BASIC. Tape - \$19.95, Disk - \$24.95

ADULT GAMES

THE NAKED GAMER: Nothing obscene - just two great games in which the losers are told to remove items of clothing. One game is a fast moving joystick type, while the other is a logic game. These games are terrific even if you keep your clothes on! B & ML. Tape - \$21.95, Disk -\$26.95

any of you used the MC-10 for this purpose? Let us know!

Books

If catching up on practically everything there is to know about computers is your goal, a book from McGraw-Hill is "must" reading. Before you head to the nearest bookstore be sure to check your expendable funds. The book carries a hefty \$79.50 price tag! While that is not a small price for a book, the amount of information contained in its 30 chapters is almost exhaustive.

The McGraw-Hill Computer Hand-book assumes the reader has no prior knowledge of computer science. However, there are portions of the book that only those who are more familiar with the technical aspects of computers will understand.

The contents include computer theory, history, computer structures, peripherals, databases, networks, computer graphics, artificial intelligence, and

computer communications, among many other topics. There are also chapters on languages, including Basic, Cobol, Fortran, Pascal, and PL/1.

This book would be helpful to someone who wants to become familiar with computers in a more sophisticated manner. The price tag should send you to the library first to determine whether this book belongs in your personal library.

Another month has passed and before long Thanksgiving will be here. Your ideas on Color Logo have been conveyed to Bill Gattis, Radio Shack's Education Director. Mr. Gattis has indicated sincere interest in your ideas, and I am certain they will be considered.

Next month some new ideas, including a feature on a computer lab furnished by the Gusdorf Furniture Company.

This is your educational forum, so be sure to write us: Goto School, **The Color Computer Magazine**, P.O. Box 8276, Akron, Ohio 44320.



★104 Pages 5½"x8½" ★Room for 420 Fields

CAN'T FIND YOUR PROGRAMS? YOU NEED THE CASSETTE STORAGE

2 SECTIONS

INDEX!

Cassette Storage Alphabetical listing with CLOAD data

Cross reference by tape with more complete field data.

ONLY

(Add \$1.75 Postage and Handling)

WA. State residents add 8.1% Sales Tax

Send Check or M.O. No COD Please



1007 North 32nd Street Renton, Washington 98056 Descriptive Brochure On Request

Circle No. 54 on Reader Service Card

Vector Addition

A FTER A LONGER than anticipated wait, Radio Shack has finally produced software that can be used in a high school curriculum. This new effort will provide an added dimension to the educational use of the Color Computer. "Vector Addition" is only one of several programs that can be used at the secondary level.

"Vector Addition" is a math and physics program that incorporates vector concepts. It was written to help students master the concepts without overemphasizing the mathematics involved. Before using this program, be certain you are familiar with vectors, including addition by the tip-to-tail method and addition by the parallelogram method.

The Vector Addition manual is divided into three sections — User's Guide, Selected Investigations, and the Answer key.

The User's Guide lets the student work through sample problems in order to become familiar with the program. The first sample problem is as follows: "Imagine that you take a walk in a city with square blocks. You walk two blocks south, three blocks east, five blocks north, four blocks west, two blocks north, two blocks west, and nine blocks south. If a crow were to fly from your starting point directly to your finishing point, how far would it need to fly and in what direction?" Helpful hints follow to help the user solve the problem.

The second section contains select-

ed investigations. This section groups problems according to topic. The topics include: fundamentals of vectors, displacement, velocity and acceleration, force, gravitation, conservation of momentum, electric forces and fields.

The final section is the answer key, which includes the correct responses to the problems in selected investigations.

Vector Addition is available on disk or tape. On tape it requires 16K Extended Basic, on disk a 32K Color Computer.

The manual is comprehensive and contains an expanded Appendix which includes "Appropriate Applications." The appropriate applications material describes how schools can best use this program. Some suggestions include: a learning lab with several computers staffed with someone to help students load and run programs and record scores; placement of computers in a regular classroom for use with individual students; checking computers out to students as a library book is checked out; and school library computer use by schedule.

Vector Addition can be used with a network system, allowing from one to sixteen computers to be used at once. Note that this is a preliminary description of the program; I suggest that one of our talented math readers review the program from a technical perspective.

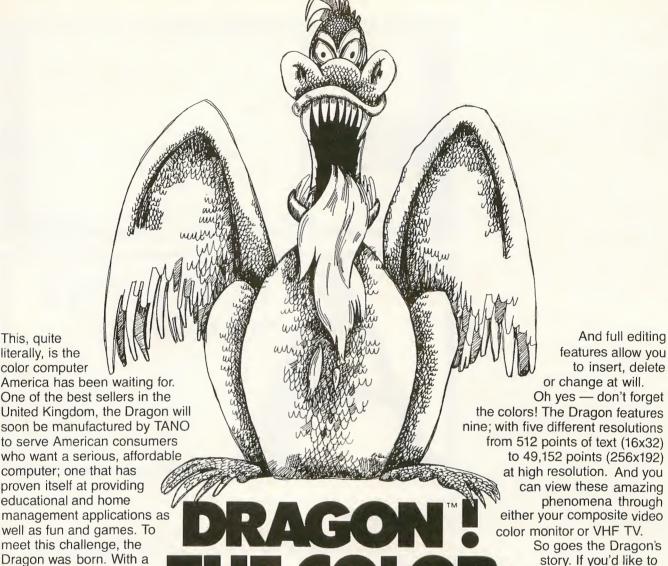
EPROM BURNER/ ROM EMULATOR

The ProtoEPROM-CC from Prototech, Inc. will program and run 2716, 2732, and 2732A EPROMs. With the built-in 4K of RAM you can create and debug your own program pack software, then copy it into EPROM. Plug the disk (or program pack) into the expansion port of the ProtoEPROM-CC to save or load EPROM images on disk. Both RAM and EPROM are programmable directly from BASIC or from assembly language. The ProtoEPROM-CC plugs in to your Color Computer ROM slot and is completely powered by the Color Computer.



\$149.95

PROTOTECH, INC. P. O. Box 12104 Boulder, CO 80303



know more, just mail the professional typewriter-style coupon or call George Merchant (our Director of Marketing) toll free at 1-800-327-7671. Software developers

Using the new 6809E Microprocessor (a great advance on the original 6502 still used by our competition), the Dragon brings advanced computer functions well within your reach. And priced below \$400, it's anything but expensive.

But these aren't the only points of difference with which our Dragon roars. Unlike most units, the Dragon gives Extended Microsoft™* Color BASIC as its standard language while the competition is still stuck in Microsoft™* BASIC training. The Dragon's advanced graphics features include set, line, draw, circle, paint, print @ and print using. Of course the Dragon also features advanced sound capabilities.

Please send me more information on the Dragon. COMPANY _ ADDRESS _ STATE __ PHONE _ 4301 Poche Court West New Orleans, LA 70129 PRODUCTS COR

*Microsoft™ is a registered trademark of Microsoft Corp.

This, quite

literally, is the

standard 64K of RAM. A

keyboard guaranteed for

20 million key operations.

And an impressive array

of options which include

disk controller and

drive, a printer, audio

modem (RS-232 serial

BASIC training manual.

cassette recorder, a

I/O), joysticks, game

cartridges and a free

Circle No. 53 on Reader Service Card

and dealer inquiries

are welcome. The

Dragon is destined

to become legend

as America dis-

covers its great

performance is no myth.

cosine, and square root functions. These are beautiful Logo applications, which are most unfortunately unavailable in Color Logo. After some serious use of Color Logo I see this as a serious shortcoming.

I do not take exception to the writer's comments (although my reference to floating decimal as unimportant was only for the lower elementary grades). As a matter of fact, I agree. Once Logo has been introduced in the schools older students will need to perform more sophisticated operations. This criticism of Color Logo is one I have heard consistently. It is my understanding that Radio Shack is working on an enhanced Logo.

Finally, a Happy Thanksgiving Logo idea. Why not see who can design the most creative turkey?

MC-10

Should the computer be used to learn programming, or should software be used for computer assisted instruction? There is plenty of room for both uses, and for educationally sound purposes.

The MC-10 is an inexpensive computer that comes with an excellent manual. Admittedly, the keyboard is small and doesn't lend itself to typing, but it can be used most effectively with "onefinger" typists (for example, most elementary school-aged children). By using the MC-10 in higher elementary grades, it can be an excellent programming tool.

You can purchase 15 MC-10's for approximately \$1200, the approved school discount price. While not the "best" use of the MC-10, 15 black and white television sets can be purchased for approximately \$750. Thus, for less than \$2000, you can install a computer lab of 15 computers. By limiting the use of the MC-10's to programming only, black and white televisions will be adequate.

Consider using the MC-10 in Grades 4 and 5 or maybe even just Grade 5. Your computer curriculum could list Grade 5 with programming as the highest priority. The 4K memory should not prove inadequate at this grade level. Your other Color Computers can then be used with available software, and with 15 MC-10's you should have an adequate supply of computers to work with one class at a

By combining Logo instruction in the lower grades, available software to supplement instruction on the Color Computer, and more sophisticated uses of Logo in the intermediate grades with programming on the MC-10, you have developed a substantial foundation for computer literacy in grades K – 5. Have to page 79



Refunded with first order

DATAMAN

Box 431, Sta. B Hamilton, Ontario Canada LBL 7W2 1-416-529-1319

> ALL PRICES IN CANADIAN DOLLARS

KEYBOARD OVERLAYS

Many programs are supplied with keyboard overlays to help you keep track of the various commands used by the program. Now you can add overlays to your own programs or to commercial programs that did not come with this feature. Die out to fit the standard Color Computer keyboard. Dealer inquiries for blank or custom printed overlays are

CAT. NO. HW002 99¢ each

This all M/L Program will copy BASIC or M/L programs including most Auto Start Programs. It will supply the beginning, ending and offset addresses and allow you to change the load address for M/L programs. It/O errors are ignored so that bad tapes can be corrected. Programs can be renamed and the motor/audio functions are controlled from the

CAT. NO. DM004 16K Ext \$12.95

BOOKS from SYBEX * BYTE * OSBORNE * RESTON

ADD 3% SHIPPING - MINIMUM 250



All correspondence concerning your subscription, i.e., changes of address, duplicate copies, etc. should be sent to Color Computer, PO Box 468, Hasbrouck Heights, NJ 07604. Please include your mailing label for speedy service. BACK ISSUES of Color Computer can be ordered by writing to Color Computer, Att: G. Purnell, Highland Mill, Camden, ME 04843. The price is \$5 per copy and all are available except the April and May 83 issues.

The Original

FLEX for Color Computers

, ବ୍ୟବ୍ୟ ବ୍ୟବ୍ୟ ପ୍ରକ୍ତ ପ୍ରକ୍ତ କ୍ରକ୍ତ କ୍ରକ୍ତ ପ୍ରକ୍ତ କ୍ରକ୍ତ କ୍ରକ୍ତ କ୍ରକ୍ତ କ୍ରକ୍ତ କ୍ରକ୍ତ କ୍ରକ୍ତ କ୍ରକ୍ତ କ୍ରକ୍ତ କ୍ର ଆନ୍ତ୍ର କ୍ରକ୍ତ କ୍ରକ୍

Upgrade to 64K

RS to FLEX, FLEX to RS file transfer ability

Create your own character set

Automatic recognition of single or double density and single or doubled sided

All features available for either single or multiple drive systems

Settable Disk Drive Seek Rates

Faster High Resolution Video Display with 5 different formats

Save RS Basic from RAM to Disk

Move RS Basic to RAM

Load and save function on FLEX disk

24 Support Commands 12 with Source Text

Languages Available

Pascal, Fortran, RS Basic, RS Assembler, TSC Basic, TSC Assembler, Relocating Assembler, Macro Assembler, Mumps

Macro Assembler, Mumps

If you are tired of playing games on your TRS-880™ Color

Computer, or find that you are handicapped by the limitations of the RS BASIC in trying to write a Program that will
allow you to actually USE the Color Computer as a COMPUTER, YOU ARE READY TO MOVE UP TO THE FLEX9™

Operating System. If you want to have REAL PROGRAMMING POWER, using an Extremely Powerful Business

BASIC, PASCALs, C Compilers, a full-blown Macro Assembler with a Library capability so you are not continuously

reinventing the wheel*, YOU ARE READ TO MOVE UP TO

THE FLEX9™ Operating System. If you would like to see if

YOU REALLY COULD USE A COMPUTER IN YOUR BUSINESS, or begin to make your Computer start PAYING IT'S

OWN WAY by doing some Computer Work for the millions
of small business around you, such as Wordprocessing,
Payroll, Accounting, Inventory, etc., then YOU ARE READY

TO MOVE UP TO THE FLEX9™ Operating System. How??

DATA—COMP has the way!

DATA-COMP has the way!

DATA-COMP's FLEX9™ Conversion for the TRS-80C™
Color Computer was designed for the SERIOUS COMPUT-

ER USER; with features like greatly increased Display ER USER: with features like greatly increased Display Screens, WITHLower Case Letters, you you can put a FULL Menu on ONE Screen, or see SEVERAL Paragraphs at the same time; with features like providing a FULL Keyboard so you have FULL Control of your Computer AND it's Programs NATURALLY, without needing a chart to see what Key Combination will give you what function; with USER ORIENTED functions to make using the Operating System natural, like having the Computer AUTOMATICALLY determine what type of Disk is being used in what type of Disk Drive and working accordingly, rather that you have to specify each and every thing for it, or like having the Computer work with the Printer you have been using all along without you having to tell the new Operating System what is there; etc., etc., etc.

DATA-COMP has everything you need to make your TRS-80C¹⁰ Color Computer WORK for YOU; from Parts and Pieces to Full, Ready To Use SYSTEMS. DATA-COMP designs, sells, services, and SUPPORTS Computer SYSTEMS, not just Software. CALL DATA-COMP TODAY to make your Computer WORK FOR YOU!

System Requirements

FLEX9 Special General Version w/Editor & Assembler (which normally sell for \$50.00 ea.) \$150.00 F-MATE(RS) FLEX9 Conversion Route, for the RS Disk

Controller when purchased with Special General FLEX9 Sys. when purchased without the General FLEX9 Sys. Set of Eight 64K RAM Chips w/Mod. Instructions Color Computer with 64K RAM and EXT. BASIC Radio Shack Disc Controller w/manual

\$49.95 \$59.95 \$59.95 \$399.95

Now Available Enhanced F-MATE Version 2.1 SPECIAL SYSTEMS PACKAGES

64K Radio Shack COLOR COMPUTER, Radio Shack COLOR DISK CONTROLLER, a Disk Drive System, Special General Version of FLEX9", F-MATE(RS)" and a Box of 10 Double Density Diskettes; a COMPLETE, ready to run SYSTEM on your Color TV Set.

A \$1079.95



FREE with F-MATE **External Terminal Program**



SECULARIA FINAL PRINCIPLE PRINCIPLE

FOR YOUR TRS-80 OR TDP-100 **EXECUTIVE GRAPHICS**

can be used for serious graphic designs, abstract art design, designing quilts or needlepoint or simply hours of fun. Capable of producing millions of multi-layered geometrical designs. Displays can be saved on tape, printer, or disc. Draws lines, circles, dots, boxes, triangles at will. Menu driven and user friendly. Designer has total control at all times. Requires 16K Ext. Basic.

Tape \$14.95/Disk \$16.95/plus \$1.50 S & H

NOVICE MORSE CODE

will run from 2.5 to 13

words per minute using 5-letter random words. Choose from 255 tones and 9 colors. Visual output makes this program usable by the hearing-impaired Does not require Ext. Basic.

Tape only \$9.95 plus \$1.50 S & H

Lighthouse Data Systems

821 Ocean Ave. Portland, ME 04103 207-761-4603

All orders except personal check shipped within 24 hours. No CODs please

SOFTWARE AUTHORS WANTED



Line lengths of 85,128 & 255 are unreadable but; can be very useful for seeing display layouts All functions appressly programable thru BASIC FULLY BASIC COMPATIBLE including CLS & PRINT &

INTRODUCING



HI-RES **SCREEN** UTILITY

\$19.95

Editor/Assembler CO-RES9

CO-RES9 is a Co-resident Editor/Assembler that will allow you to create, edit and assemble machine language programs for the color computer. It will quickly and efficiently convert assembly language programs into machine code files. It will output machine object code to either cassette tape in a CLOADM compatible format or directly to memory for direct execution. NOW

CO-RES9 editor/assembler tape

ONLY \$39.95. \$29.95

R.S. DISK EDITOR & ASSEMBLER DISK

\$79:95 \$49.95

"The Professional's Word Processor" TEXT PROCESSOR FEATURES - Character Fill Footer - Right Justify Line - Right Justify Line - Three Programmable Headers - Ten Programmable Headers - Ten Programmable Tab Stops - Margin Justification - Left & Right - Line - L

- essing rsion Has a 52K
- Append Files from Tape or Disk

 Fully integrated Disk File
 Handler

 Edit or Process Files Larger
 Than Memory

TEXT PRO II Features Over 70 Commands In All. Disk ... \$79.95

TERMINAL PACKAGE

5566 Ricochet Avenue

Las Vegas, Nevada 89110

- Display On Screen Or Output Contents Of Buffer To Printer
- Save & Load Text Buffer To Tape Or Disk Send Files Directly From Buffer Or Disk
- Programmable Word Length, Parity & Stop Bits
 Automatic Buffer Size At Memory Limit

Datapack on tape w manual \$24.95 Diskpack for R.S. disk w manual \$49.95 All Orders Shipped

From Stock Add \$2.50 Postage

(702) 452-0632

Circle No. 49 on Reader Service Card

♠ from page 74

American," published by Grolier Inc. "Academic American" consists of 21 volumes and nearly 28,000 articles. This is not the equivalent of a large encyclopedia, but it is a large data bank which will be continuously expanded and updated. The updating feature is especially attractive; it will provide the most recent information on the topic being researched.

Research is conducted easily. Each research topic has a menu which helps the user find the necessary information without having to read through impertinent material. Cross references assist in finding related information.

'Academic American" is not a substitute for thorough research. CompuServe has made an excellent resource available, but it does not provide all the ingredients necessary for a complete report. One problem is the lack of illustrations; also, the depth to which each topic is covered may not be as thorough as the printed material in an encyclopedia or resource

The electronic data bank is going to become an important ingredient in home and school education. My primary concern is whether the cost will prevent schools from making this service available to students.

Logo

Color Logo has been a welcome addition to the software available for the Color Computer. This language is essential for young learners. When evaluating Color Logo, remember that it is one of the lowest-priced versions available, and therefore some features contained in more expensive Logo versions do not appear in Radio Shack's Color Logo. This should not present a major problem during the first year of Color Logo use because it will be new to everyone. The future will necessitate an updated version which will include (at the very least) a floating decimal point. This will be essential for Logo use in intermediate to upper

Here are some comments on Color Logo from an interested educator in Davis, California. "I think, as you do, that Logo is an invaluable aid for teaching what computers can do; for an excellent introduction to programming; and to simply have fun. However, I strongly disagree with you when you state that the floating decimal is unimportant. True, in the elementary grades, say K - 4, it is unimportant. Thereafter decimals become important in the math curriculum and should be implemented in Logo. Later on they become even more essential to the full use which can be made of Logo. I refer to simple programs to create sine,

DEL Systems, Inc.

COLOUR SOFTWARE WORKBENCH

The Colour Software Workbench is a complete software development system for those who wish to do comprehensive program development on their TRS-80 Color Computer. The Colour Software Workbench transforms the TRS-80 Color Computer from a "BASIC Machine" into a "Real Computer System" by providing Color Computer users with the same tools and facilities used by professional programmers in the field. For those who want to program in an English-like language but don't want to pay the price of slow program execution, the Colour Software Workbench is ideal. The Colour Software Workbench allows Color Computer users to write their programs in the familiar English-like expressions of PASCAL while achieving the execution speeds of machine language with the Colour PASCAL Compiler.

TEXT EDITOR

The Colour Text Editor is a screen mode, in-memory, text editor which provides its users with a selectively moveable "window" into a text file. The Colour Text Editor was designed primarily for the development of program source code, but it can also be used in conjunction with some text formatting capabilities (which you minstail as a learning exercise) for the production of software documentation. As an example, this text and the CSW User's Guide were both developed with and produced by the Colour Text Editor and the "Text Formatter".

The Colour Text Editor is an excellent tool for developing PASCAL and ASSEMBLER source programs. The Colour Text Editor manipulates blocks of text efficiently and minimizes delays imposed by the speeds of I/O devices such as the Color Computer's floppy disk drive(s) or cassette tape recorder. The Colour Text Editor provides automatic left-right/right-left and up-down/down-up scrolling in conjunction with powerful FIND and CHANGE commands. Additional commands facilitate the replication of text blocks as well as their bulk movement within a text file. Text files created with BASIC are compatible with the Colour Text Editor. With the Colour Text Editor text files can be read and optionally merged from either cassette and/or disk and may then be written to either cassette, disk, or the printer. It should be mentioned that all of the keys have an auto-repeat capability. printer. It should auto-repeat capability.

PASCAL COMPILER

The Colour PASCAL Compiler is a fully recursive PASCAL language compiler which processes PASCAL program statements into machine executable binary for the TRS-80 Color Computer's 680 micro-processor. The Colour PASCAL Compiler provides Color Computer programmers with PASCAL as an ideal "Systems Programming" language or the ability to write programs in the English-like "High Level expressions of PASCAL without any sacrifice of program execution speeds. The Colour Text Editor, 6809 Macro Assembler, and Colour Linker were all written in PASCAL and produced by the Colour PASCAL Compiler and they, like the ROM Monitor software of the TRS-80 Color Computer, are machine executable programs.

The Colour PASCAL Compiler is a device-independent software package

Computer, are machine executable programs.

The Colour PASCAL Compiler is a device-independent software package designed to economically translate PASCAL source programs into efficient 6809 micro-processor machine programs in one pass. Program source files may be read from either cassette or disk with the resulting machine program object files written to either cassette, disk, or the serial I/O port. The Colour PASCAL Compiler parses and evaluates PASCAL language statements and declarations and generates the corresponding 6809 micro-processor machine programs in accordance with "Standard PASCAL" language syntactical rules and conventions. The Colour PASCAL Compiler supports all "Standard PASCAL" features with the major exceptions being real or floating point arithmetic and pointers. Many University of California at San Diego (UCSD) PASCAL features are also supported in conjunction with some additional comprehensive extensions which enhance both the PASCAL Compiler is also equipped with powerful compiler directives and comprehensive source listing aides, such as meaningful error messages and optional statements. of of

OBJECT LINKER

The Colour Linker is a program which reads the program object files produced by both the Colour PASCAL Compiler and 6809 Macro Assembler and converts them into machine executable binary image files, "Load Modules", suitable for loading with the Color Computer's LOADM command. The Colour Linker can also read multiple program object files and combine them into one larger machine executable binary "Load Module" so as to allow Color Computer users to develop very large programs one piece at a time. The Colour Text Editor, Colour PASCAL Compiler, 6809 Macro Assembler and Symbolic On-Line Debugger, were all developed with the Colour Linker.

The Colour Linker is an excellent tool for the development of "Load Modules" from either or both PASCAL and ASSEMBLER object files. The Colour Linker is a device independent software package, comparable to linkage editors found on industry computers. It is capable of linking up to thirty program object files into one machine executable load module. Up to three hundred public symbols can be defined for all object files to be linked by the Colour Linker. The Colour Linker supports object code relocation, automatic Colour Software fun Time Library module inclusion, and a built in Symbolic On-Line Debugger interface. All machine executable binary load modules produced by the Colour Linker are compatible with the Color Computer's BASIC monitor, and, during their production, the Colour Linker generates load maps and error messages so as to report the status of any linking operation.

Shipped UPS as soon as your check clears, sooner if you charge MasterCard and VISA accepted

Volume discounts available

"TRS-80" and "Color Computer" are Trademarks of TANDY Corporation

Software Diskette and 200 page User's Guide w/Language References



\$150.00



Add 3% for shipping and handling Md. residents add 5% Sales Tax

Circle No. 47 on Reader Service Card

The Colour Software Workbench requires a TRS-80 Color Computer to be configured with at least 32K of memory, Extended Disk BASIC, and one floppy disk drive.

The Colour Software Workbench is a complete set of software development tools designed to support a programmer through the process of creating computer programs; from the entering of source code through the execution of the resulting machine program. The Colour Software Workbench is comprised of the following software packages:

MACRO ASSEMBLER

The 6809 Macro Assembler is a Motorola compatible macro assembler which processes Motorola 6809 Assembler language program statements into machine executable binary for the TRS-80 Color Computer's 6809 micro-processor. The 6809 Macro Assembler makes it easy to write Motorola assembler language programs which are compatible with PASCAL programs developed with the Colour PASCAL Compiler. The 6809 Macro Assembler is a powerful tool which enables Color Computer users to develop programs which are best suited for assembler language implementation. The Colour PASCAL Compiler and Symbolic On-tine Debugger were both written in Motorola 6809 Assembler language and produced by the 6809 Macro Assembler. The 6809 Macro Assembler fills any software development gaps not closed by the capabilities of the Colour PASCAL Compiler so that in its entirety, the Colour Software Workbench will support any program development effort that a Color Computer user may wish to attempt.

The 6809 Macro Assembler is a device-independent software package designed to economically translate Motorola 6809 Assembler source programs into 6809 micro-processor machine programs in two passes. Program source files may be read from either cassette or disk with the resulting machine program object files written to either cassette, disk, or the serial I/O port. The 6809 Macro Assembler parses and evaluates Motorola 6809 Assembler language statements and declarations, and generates the corresponding 6809 micro-processor machine programs in accordance with Motorola 6809 Macro Assembler language syntactical rules and conventions. The 6809 Macro Assembler's powerful macro facility allows Color Co puter users to define their own "Macro" instructions; the ability to write an assembler language subroutine using only one macro instruction to identify it in the source program. Each Macro instruction defined to the 6809 Macro Assembler may have up to nine parameters for argument passing between macro subroutines. The 6809 Macro Assembler's object code format provides for program relocation, separate assembly, and easy interfacing to PASCAL via the Colour Linker. The 6809 Macro Assembler supports all Motorola 6809 Assembler monics as well as several declaration extensions which simplify the interfacing of 6809 Assembler programs to PASCAL programs at the source code level. The 6809 Macro Assembler programs to PASCAL programs at the source code level. The 6809 Macro Assembler is also equipped with powerful assembler directives such as the COPY facility which provides the ability to include other source programs as parts of one larger source program. SOWICE DEBUGGER

SYMBOLIC DEBUGGER

The Symbolic On-Line Debugger, when linked to a program developed with the Colour Software Workbench, provides its users with a "window" into the Color Computer's 6809 micro-processor's execution of that program at the machine level. The Symbolic On-Line Debugger was designed to allow a programer to selectively control the execution of a program, see the actual contents of the Color Computer's memory and the 6809's internal registers during that program's execution. The Symbolic On-Line Debugger's user may reference sections of a program with the same symbolic names that were used in the programs source code rather than with memory addresses so that the user need not be a computer wizard in order to debug a program at the micro-processor level. The Symbolic On-Line Debugger also allows its users to change the contents of both the Color Computer's memory and the 6809 micro-processor's internal registers so that temporary program fixes and experiments can be performed as the program is being executed.

The Symbolic On-Line Debugger is an excellent tool for debugging machine programs developed in either PASCAL or ASSEMBLER. The Symbolic On-Line Debugger allows a user to stop and start a program under test at almost any point. Once the program under test has been stopped, the Symbolic On-Line Debugger allows the user to select any memory location or micro-processor register for the display of its contents. The Symbolic On-Line Debugger user may then select any memory location or micro-processor register and enter a new value for replacement of the previous value. For example, when entering a number for a contents replacement, an expression may be entered which is converted and stored by the Symbolic On-Line Debugger. The Symbolic On-Line Debugger provides a "Trace" facility which lists all of the active procedures within a program, by name, in order of their activation by the 6809 micro-processor, thus providing a "procedure call" history. The Symbolic On-Line Debugger automatically preserves the screen of the program under test whenever that program is stopped, and automatically restores the screen of the program under test whenever that program is restarted. This makes the Symbolic On-Line Debugger very handy for use with applications using graphics.

To order send Name and Address and check or money order to:

> DEFT Systems, P.O. Box 359 Damascus, Md. 20872

or Call TOLL FREE: 1-800-368-3238 Operator 8

TOLL FREE Virginia: 1-800-542-2224 Operator 8



ANY PEOPLE SEEM TO view the computer as a cure for all the educational ills that befall us. Not so! We really don't know whether there will be long-term effects on the learning process through the use of computers.

There is evidence that learning with a computer is rapid, i.e., students "catch on" more quickly than with conventional teaching methods. The question is whether the material will be *retained* by the student. I am always amazed at how quickly younger children grasp the concept of a complicated video game. Caution is needed, however, when introducing new material; even if students have shown evidence they understand the material, be sure to use follow-up activities that reinforce learning over an extended period of time.

Good math programs serve as examples of what I am saying. For example, when introducing math through the Bertamax programs, the teacher can offer beginning level math material and build with more complex problems. An outstanding feature of the Bertamax materials is the review capability offered with the series.

A second concern I have is the *impact* of the computer configuration on learning. St. John's University has been involved for many years in learning styles research, in a project directed by Dr. Rita Dunn. Briefly, this research has demonstrated that some children learn best alone, some in pairs, some in small groups, some with adults teaching them, and some in a variety of ways. There are other factors that also affect learning. There is a distinct possibility that placing a child in a computer-oriented learning environment, that is not articulated with his learning style, may be detrimental or at least an obstacle to his learning successfully.

by Dr. Paul Kimmelman

I believe learning style research on computers is an area that needs to be explored in controlled experimental situations. Next month I will provide a detailed explanation of the learning styles concept.

Television or Monitor?

A frequently asked question is: What kind of TV or monitor should I use with my Color Computer? I hear this question most often from school administrators who are operating under limited budgets. In my opinion there are two different responses to this question, one offering better results but costing more money.

The school district where I work purchases off-brand 13-inch color televisions for approximately \$190 each. The televisions normally carry a one-year warranty, and are purchased from reputable appliance dealers. After one school year of use we have found these televisions remain dependable and adequate. It must be emphasized, however, that the color, clarity, and interference are sometimes bothersome, but when balancing cost versus results we had to place cost as our highest priority. These \$190 televisions could not be compared to the Radio Shack or Sony 13-inch models that sell for almost double the price, or to the Amdek Color I monitor.

The preferred method would be to use

a monitor to totally eliminate any interference and provide improved color quality and clarity. I prefer the Amdek Color I monitor with a Color Computer Audio/Video Interface from Cheshire Cat Computer Creations. If cost is not a major factor this should be the preferred alternative, especially if character resolution is essential for your computer use. The Cheshire Cat cable is unique because you can not only use a color monitor, but also a monochrome monitor alongside it. The cable has three output ports, one for color, one for monochrome, and one for audio.

Monochrome monitors are ideal for word processing. They produce crisp, clear letters without "bleeding."

The Cheshire Cat cable is easy to install and sells for approximately \$30. The Amdek Color I sells for approximately \$350.

A monitor is *not* a television receiver: you cannot use it to view different stations unless it is connected to a tuner.

CompuServe

The computer is rapidly changing the way information is retrieved. It has been traditional to have a set of encyclopedias in the home to help children with school assignments. School libraries usually purchase several sets of encyclopedias for their resource sections. The encyclopedia is still a common means of educational research, but the computer is beginning to enter this field.

Picture your child coming home for dinner and announcing he has a report on weather due the next morning. The library is closed and you have no books on weather in your house. However, you do have a Color Computer, modem, and a membership in CompuServe: you can resolve the problem with relative ease.

CompuServe offers the "Academic

♦ to page 76

```
10096 DATA 0,0,0,0,0,0,0,0
10097 DATA 0,0,14,1,15,17,15,0
10098 DATA 16,16,22,25,17,25,22,0
10099 DATA 0,0,14,17,16,17,14,0
10100 DATA 1,1,13,19,17,19,13,0
10101 DATA 0,0,14,17,31,16,14,0
10102 DATA 2,5,4,14,4,4,4,0
10103 DATA 0,0,13,19,19,13,17,14
10104 DATA 16,16,22,25,17,17,17,0
10105 DATA 4,0,12,4,4,4,14,0
10106 DATA 0,0,1,0,1,1,17,14
10107 DATA 16,16,18,20,24,20,18,0
10108 DATA 12,4,4,4,4,4,14,0
10109 DATA 0,0,26,21,21,21,21,0
10110 DATA 0,0,22,25,17,17,17,0
10111 DATA 0,0,14,17,17,17,14,0
10112 DATA 0,0,22,25,17,31,16,16
10113 DATA 0,0,13,19,17,31,1,1
10114 DATA 0,0,22,25,16,16,16,0
10115 DATA 0,0,15,16,14,1,30,0
10116 DATA 4,4,31,4,4,5,2,0
10117 DATA 0,0,17,17,17,19,13,0
10118 DATA 0,0,17,17,17,10,4,0
10119 DATA 0,0,17,17,21,21,10,0
10120 DATA 0,0,17,10,4,10,17,0
10121 DATA 0,0,17,17,31,1,17,14
10122 DATA 0,0,31,2,4,8,31,0
```

Program Listing 2. Eight by Nine Character Generator

- 100 '8 BY 9 TEST GENERATOR
- 110 PMODE 4,1
- 120 SCREEN 1,0
- 130 PCLS
- 140 VV=0
- 150 FOR YY=0 TO 20
- 160 FOR XX=0 TO 31
- 170 TS=&H3800:GP=&HE00
- 180 GOSUB 230
- 190 VV=VV+1:IF VV=123 THEN VV=0
- 200 NEXT XX
- 210 NEXT YY
- 220 GOTO 220
- 230 '8 BY 9 CHARACTER GENERATOR
- 240 ' VV=CHARACTER, 0-255
- 250 ' XX=CHAR. POSITION, 0-31
- 260 ' YY=ROW POSITION, 0-20
- 270 ' TS=START OF CHAR. TABLE
- 280 ' GP=START OF GRAPHICS PAGE
- 290 GP=XX+YY*288+GP 'CHANGE TO G
- P=XX+YY*256+GP FOR 8X8
- 300 FOR RW=0 TO 7
- 310 VL=PEEK(TS+VV*8+RW)
- 320 POKE GP, VL
- 330 GP=GP+32
- 340 NEXT RW
- 350 RETURN



"AN ABSOLUTE JEWEL", "THE PERFECT DBM"
"I USE C.C. WRITER FOR MY CORRESPONDENCE"
"IMPRESSIVE", "JUST RIGHT", "PROFESSIONAL"

Trans Tek Software

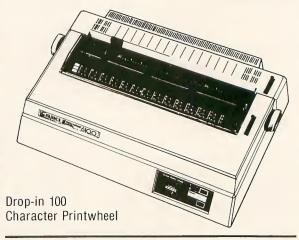
has earned these words of praise from reviewers in The Rainbow, 80 Micro, Creative Computing, and other publications. Like our customers, you'll see why when you buy:

- C.C. Calc The Electronic Spreadsheet \$34.95
- C.C. File The Micro Data Base Manager \$12.95
- C.C. Writer Versatile Word Processing \$29.95
- C.C. Mailer Mailing List/Letter Merge \$29.95

JUKI MODEL 6100 LETTER QUALITY DAISYWHEEL PRINTER!!

18 c.p.s. • 2K (expandable to 8K) Buffer • Optional Tractor Feed • Uses IBM Ribbons • Rugged Construction • Complete Kit, Ready to Plug In To Color Computer, Including Serial to Parallel Converter!!

\$689.00



UPGRADE YOUR COCO THIS FALL

SOFTWARE

The Official

ZAXXON

by SEGA

(from Datasoft)

Probably the most incredible arcade game ever is now available for the Color Computer. **NOTE:** this is **the official** ZAX-XON, not an imitation!

Now Only \$29.95

THE KING

by Tom Mix Software

Four full graphic screens. Exciting sound and realistic graphics. Never before has the color computer seen a game like this.

 Tape
 \$26.95

 Disc
 \$29.95

LANCER

from Spectral Associates

This is the revolutionary new "JOUST" type game. (Watch out for THE INVINCIBLE DEAD-LY BUZZARD!)

 Tape
 \$21.95

 Disc
 \$25.95

SPEAK UP!

from Classical Computing, Inc.

This is an exciting utility for converting text to speech. (No hardware mod. needed.) Easy to use.

Tape\$29.95

HARDWARE

16K-32K UPGRADE KIT

Kit includes 8 200 ns #4116 Factory Prime Chips, piggybacked sockets, SAM socket, and "32K" button to replace the 16K on your computer's case. Easy to remove. Instructions included \$25.95

64K UPGRADE KIT

Nanos Reference Cards

Color Computer & TDP-100
Color BASIC & EXTENDED 4.95

DATA CASSETTES

CO5 C10
\$.65 ... Qty. 1-10 ... \$.70
\$.60 ... Qty. 11-20 ... \$.65
Soft Poly Cases ... Ea. \$.20

WABASH DISKETTES

JOYSTICK INTERFACE

Use ATARI or WICO Joysticks with your COCO! (Can interface 2 joysticks) \$19.95

WICO COMMAND CONTROL JOYSTICK

The best joystick available for COCO...

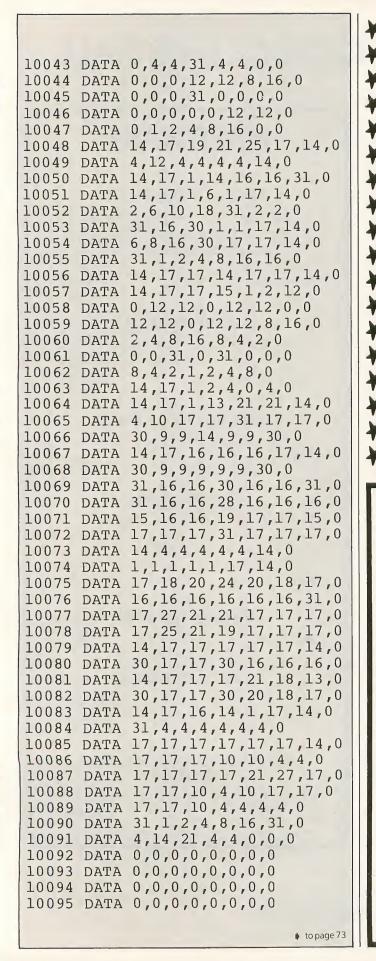
\$29.95

Add \$1.50 per software order and \$2.00 per hardware order for postage and handling.

California residents add 6% Sales Tax.

QUASAR ANIMATIONS

1520 Pacific Beach Drive, San Diego, California 92109 (619) 274-2202



NEW for the Color Computer TRS-80*

'COCOCASSETTE' SUBSCRIPTION SOFTWARE

*TRS 80 IS A TRADEMARK OF TANDLY COMPANY



ENJOY A MONTHLY COLLECTION OF 8-10 PROGRAMS!

Including games, education, home finance and more; on cassette for as low as \$5.00 a month! Add some action and imagination to your Color Computer...Best of all, we do the work!

PRICES					
1 YR (12 ISSUES)					\$55.00
6 MO (6 ISSUES).					\$30.00
SINGLE COPIES					\$ 6.00

MICHIGAN RESIDENTS ADD 4% TO ORDER
 OVERSEAS ADD \$10.00 TO SUBSCRIPTION AND \$1.00 TO SINGLE COPIES

616 396-7577



PROGRAMS ARE FOR EXTENDED BASIC MODEL ONLY ISSUES ARE SENT FIRST CLASS

SUBSCRIPTION SOFTWARE



SEND CHECK OR MONEY ORDER TO:

T & D SOFTWARE

P.O. BOX 256-C • HOLLAND, MICH. 49423





ATLANTIS TEXT ADVENTURE - This one is tough! We challenge you to complete this in 30 days. If you can we will send you any cassette program we sell at no charge. (We will even pay the postage.) You start on a disabled sub, near the lost city of Atlantis. Your object is to raise the submarine and yourself safely to the surface. Your tape will have a 16K EXT version on one side and a 32K EXT version on the other.

Atlantis Adventure - Postpaid

\$21.95

ADVENTURE STARTER PACKAGE - Learn to play those adventures the painless way. You start with an easy adventure and move into an intermediate. Two complete adventures plus hints and tips on adventuring. Cassette 16K EXT - Postpaid \$17.95

OWLS EYE INDICATOR LIGHT

Don't leave your coco on and fry your chips! The OWLS EYE plugs into either joystick port and may be mounted beside the keyboard where it is easily visible. Simple 10 second installation! We pay first class postage in the USA and Canada.

OWLS EYE - Postpaid

\$ 8.95



C.O.D. orders, please add \$1.50 No delay for personal checks OWLS NEST SOFTWARE P. O. BOX 579 C OOLTEWAH, TN 37363



AUTO-DIALER

by Soundworks

AUTOMATIC PHONE DIALER

ULTRA HIGH SPEED DIALING
AND REDIALING

STORE OVER 50 NUMBERS

NO MODIFICATION TO COCO NECESSARY

NO MODEM REQUIRED
SIMPLE HOOK-UP

ADAPTABLE TO ANY ROTARY OR PUSH-BUTTON PHONE

✓ 16K EXTENDED REQUIRED

CASSETTE \$24.95 DISK \$34.95

Soundworks Productions

26 EAST 7th STREET DEPT. J
PATCHOGUE, NEW YORK 11772
N.Y.S. RESIDENTS: ADD 7.25% TAX

THE CHEAP TALKER

for the

RADIO SHACK COLOR COMPUTER

The Speech Synthesis Cartridge Pak that lets your Co-Co talk!

FEATURES: \star Unlimited Vocabulary \star 64 Phonemes \star 4 Programmable Pitch Levels \star Manual Pitch and Volume Controls \star sound from Your TV or external

INCLUDED: ★ COMPLETELY ASSEMBLED AND TESTED SYSTEM ★ PC BOARD IS IN A PLASTIC CARTRIDGE CASE ★ USES SC-01, 6821, AND LM386 ICS, ALL SOCKETED! ★ SPEECH SYNTHESIS MANUAL WITH DETAILED SCHEMATICS ★ PROGRAMS ARE PROVIDED ON CASSETTE (16K/32K EXTENDED BASIC AND MACHINE LANGUAGE) AND ARE EASILY TRANSFERRED TO DISK

The "CT" has got to be one of the lowest priced Phoneme Speech Synthesis Systems ever! And it is easy to use. Just plug in the cartridge like you would a ROMpak, into the side of the Color Computer or into your expansion unit. Then load one of the programs provided, or mix them with your own creations, and run.

You get all of this at the Low Price of \$79

Also sold separately:

Assembled and tested Cheap Talker system less SC-01 IC \$45 Bare Circuit Board \$15 Manual \$10 S&H \$3

Write for Free Catalog of other Color Computer Items.

KELTY ENGINEERING

1440 N 61st, Lincoln, NE 68505 (402) 467-3298

Dealer & Author Inquiries Invited

SPEECH SYNTHESIS SYSTEM

Circle No. 43 on Reader Service Card

Program Listing 1. Character Store Program

```
'CHAR TABLE STORED AT &H3800
51 FOR I=&H3800 TO &H3800+983
52 READ A: POKE I, A
53 NEXT I
54 STOP
10000 DATA 0,0,0,0,0,0,0,0
10001 DATA 0,0,0,0,0,0,0,0
10002 DATA 0,0,0,0,0,0,0
10003 DATA 0,0,0,0,0,0,0
10004 DATA 0,0,0,0,0,0,0
10005 DATA 0,0,0,0,0,0,0
10006 DATA 0,0,0,0,0,0,0
10007 DATA 0,0,0,0,0,0,0
10008 DATA 0,4,8,31,8,4,0,0
10009 DATA 0,4,2,31,2,4,0,0
10010 DATA 0,4,4,21,14,4,0,0
10011 DATA 0,0,0,0,0,0,0
10012 DATA 0,0,0,0,0,0,0
10013 DATA 0,0,0,0,0,0,0
10014 DATA 0,0,0,0,0,0,0
10015 DATA 0,0,0,0,0,0,0
10016 DATA 0,0,0,0,0,0,0
10017 DATA 0,0,0,0,0,0,0
10018 DATA 0,0,0,0,0,0,0
10019 DATA 0,0,0,0,0,0,0
10020 DATA 0,0,0,0,0,0,0
10021 DATA 0,0,0,0,0,0,0
10022 DATA 0,0,0,0,0,0,0
10023 DATA 0,0,0,0,0,0,0
10024 DATA 0,0,0,0,0,0,0
10025 DATA 0,0,0,0,0,0,0
10026 DATA 0,0,0,0,0,0,0
10027 DATA 0,0,0,0,0,0,0
10028 DATA 0,0,0,0,0,0,0
10029 DATA 0,0,0,0,0,0,0
10030 DATA 0,0,0,0,0,0,0
10031 DATA 0,0,0,0,0,0,0
10032 DATA 0,0,0,0,0,0,0
10033 DATA 4,4,4,4,4,0,4,0
10034 DATA 17,17,17,0,0,0,0,0
10035 DATA 10,10,31,10,31,10,10,0
10036 DATA 4,15,20,14,5,30,4,0
10037 DATA 12,13,2,4,8,19,3,0
10038 DATA 8,20,20,8,21,18,13,0
10039 DATA 12,12,8,16,0,0,0,0
10040 DATA 2,4,8,8,8,4,2,0
10041 DATA 8,4,2,2,2,4,8,0
10042 DATA 4,21,14,31,14,21,4,0
```

♠ from page 67

other Basic code. Variable VV is the character code, from Table 1. The character code is a value from 0 through 255. XX is the character position number and YY is the line number for display. Character positions are numbered from 0 through 31, while line positions are numbered from 0 through 20.

Variable TS is the starting location of the graphics table, in this case &H3E00. Variable GP is the starting location of the graphics page, in this case &HE00 (or &H600 for a non-disk system).

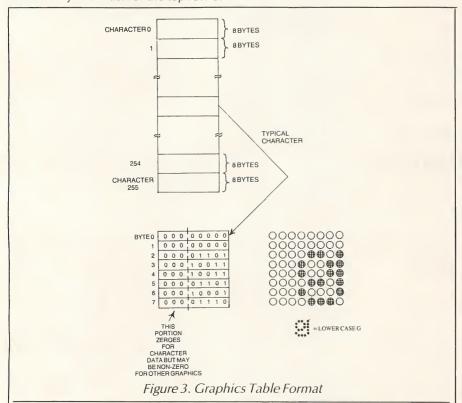
The expression: $XX + YY \times 288 + GP$ locates the byte location of the top row of

the character position within the graphics page. One byte of data from the graphics table is then stored in each of eight rows of graphics data to make up the character.

The driver program before the subroutine constructs a screen full of characters from the graphics table over 32 characters by 21 lines. If you run it, don't forget to protect memory and relocate the graphics data using Program Listing 1 first.

Next month – the end of the story!

Program on page 70



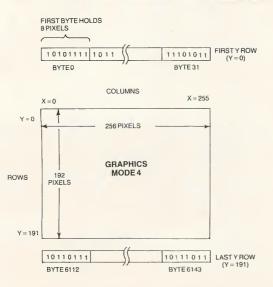


Figure 4. Graphics Mode 4 Memory Mapping

ary can be expanded. Truly professional program. \$69.29 for RS disk or cassette, \$89.29 for Flex.

HUMBUG — The Ultimate Monitor has 37

Color Computer Programs

From Star-Kits

SPELL 'N FIX — Essential for serious word processing! Finds and fixes spelling and

typing mistakes fast. 20,000+ word diction-

commands to enter, examine, start, stop, even single-step machine language programs, and more. \$39.95 on disk or cassette for 16K or 32K systems, \$59.95 for 64K systems.

CHECK 'N TAX — Set of programs to balance checkbook and keep tax data on disk. \$50.

REMOTERM — Allows using a terminal to give the Color Computer a full 24x80 display for serious users or remote operation. \$19.95.

LFPRINT — Permits use of a non-standard printer. \$19.95.

NEWTALK — Voice output program to examine and check memory. \$20.

SHRINK — Our fast version of Eliza. \$15. OXXO — Our fast version of Othello. \$15. CHECK 'N TAX requires 32K, all others 16K. We accept cash, check, COD, Visa or MC. NY State residents please include sales

Star-Kits

P.O. Box 209—C Mt. Kisco, N.Y. 10549 (914) 241-0287

Circle No. 40 on Reader Service Card

New! Quality Software for Ages 3–6

EARLY LETTER RECOGNITION and KIDS' CHOICE (a number recognition game) have been developed specifically for pre-schoolers. Our "activity center" approach, along with outstanding animated graphics, introduces the young child to the keyboard, software-usage skills, and to the realization that the TV can be much more than merely an electronic pacifier.

At Software Specialists, we are excited about the idea that this will be the first generation to grow up relating to computers as an integral part of everyday life. We offer programs that foster early familiarity and pleasure with the Color Computer, laying the foundation for effective and enthusiastic utilization of computers in grade school and beyond. EARLY LETTER RECOGNITION . . \$12.95 KIDS' CHOICE \$12.95

Order both programs for \$19.95
(System: 16K minimum, cassette-based)
Source listings: \$2.95 each, modifiable
(available with cassette order only).

KIDSWARE from SOFTWARE SPECIALISTS

P.O. Box 2029 Princeton, N.J. 08540

Circle No. 41 on Reader Service Card

Color Computer/69

				Figu	re 2. 3	5x7 Dot Matrix C	haracters		
CHARACTER	0	CHARACTER	1 8	CHARACTER 00000 0000 0000	36	CHARACTER 54	CHARACTER /2	CHARACTER 90	CHARACTER 1
CHARACTER	1	CHARACTER	19	CHARACTER 8800	37	CHARACTER 55	CHARACTER 73	CHARACTER 91	CHARACTER I
CHARACTER	2	CHARACTER	20	CHARACTER 808 80000	38	CHARACTER 56 8 000 8 8 000 8	CHARACTER 74	CHARACTER 92	CHARACTER 1
CHARACTER	3	CHARACTER	21	CHARACTER 088	39	CHARACTER 57	CHARACTER 75	CHARACTER 93	CHARACTER 1
CHARACTER	4	CHARACTER	22	CHARACTER	40	CHARACTER 58 88 88	CHARACTER 76	CHARACTER 94	CHARACTER 1
CHARACTER	3	CHARACTER	23	CHARACTER	41	CHARACTER 59	CHARACTER 77	CHARACTER 95	CHARACTER 1
CHARACTER	6	CHARACTER	24	CHARACTER	42	CHARACTER 60	CHARACTER 78	CHARACTER 96	CHARACTER 1
CHARACTER	7	CHARACTER	25	CHARACTER	43	CHARACTER 61	CHARACTER 79	CHARACTER 97	CHARACTER 1
CHARACTER 08000	å	CHARACTER	26	CHARACTER 088	44	CHARACTER 62	CHARACTER 80	CHARACTER 98	CHARACTER 1
CHARACTER 00080	9	CHARACTER	27	CHARACTER	45	CHARACTER 63	CHARACTER 81	CHARACTER 99	CHARACTER I
CHARACTER	10	CHARACTER	28	CHARACTER 88	46	CHARACTER 64	CHARACTER 82	CHARACTER 100	CHARACTER 1
CHARACTER	11	CHARACTER	29	CHARACTER	47	CHARACTER 65	CHARACTER 83	CHARACTER 101	CHARACTER 1
CHARACTER	12	CHARACTER	30	CHARACTER	48	CHARACTER 66	CHARACTER 84	CHARACTER 102	CHARACTER I
CHARACTER	13	CHARACTER	31	CHARACTER 08 080	49	CHARACTER 67	CHARACTER 85	CHARACTER 103	CHARACTER 1
CHARACTER	14	CHARACTER	32	CHARACTER OOOO OOOO	50	CHARACTER 68	CHARACTER 86	CHARACTER 104	CHARACTER I
CHARACTER	15	CHARACTER 8 8 8 0	33	CHARACTER 0000 000	51	CHARACTER 69	CHARACTER 87	CHARACTER 105	CHARACTER
CHARACTER	16	CHARACTER 8 8 8 8	34	CHARACTER	52	CHARACTER 70	CHARACTER 88	CHARACTER 106	
CHARACTER	17	CHARACTER 00000 00000	35	CHARACTER 00000 0000 0000	53	CHARACTER 71	CHARACTER 89	CHARACTER 107	

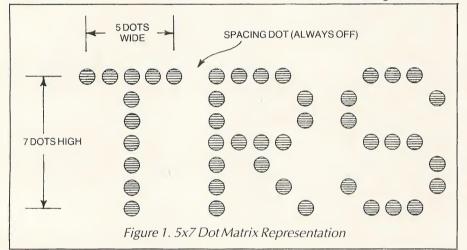
Listing 1 is a Basic program that holds 123 separate characters, arranged in the order shown in Table 1.

If you look at the ASCII representation in your Color Computer manual, you'll find that the decimal values for the characters in the Table are almost identical to the values in the manual. This will be helpful when converting between strings and the equivalent graphics table character. The "unused" slots in the table still take up eight bytes of space; they are available for any new graphics characters, including any 8 by 8 shapes we'd care to define.

Listing 1 relocates the first 123 characters to user RAM, starting from &H37FF (14335 decimal). Note that the last three digits of the line number correspond to the decimal code for the character in the Table. Before running this program to store the graphics data, Enter CLEAR 100.&H37FF.

Using the Graphics Data

Now I had the data; how hard would it be to use? I set out some ground rules:



- The graphics data was to be used in the graphics pages only
- The graphics mode would be PMODE
 4, the 256 by 192 resolution mode

The graphics pages are located just after the text area in a non-disk system, or a little further on in a disk system. The actual location for non-disk is &H600 (1536 decimal) and for disk is &HE00 (3584 decimal). A word of warning: be sure to use the &HE00 area in a disk system. If you store data in the &H600 area in a disk system, catastrophic things may happen to your disk. Listings all use the &HE00 area — change &HE00 to &H600 in a non-disk Color Computer.

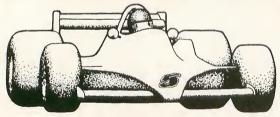
The graphics mode would have to be the highest resolution mode, because this is the only mode that supports 256 dots horizontally. In this mode, the graphics page is "mapped," as shown in Figure 4. The top row (Y=O) is located in the first 32 bytes of the page, the next row is located in the next 32 bytes, and so forth.

I tried the simplest case first, generating an 8 by 9 character over the entire screen. Program Listing 2 is the result.

The software "character generator" for this program is indeed fairly simple. It's in the form of a subroutine, called by

to page 69

SOFTWARE FOR THE TRS-80* COLOR COMPUTER!



REVOLUTION!

You accelerate hard down a long straightaway, braking heavily at the end for a sharp corner. You slice smoothly through the esses, and then boldly keep the power on for a fast sweeper. The Ferrari drifts dangerously near the edge, but you make a tiny correction in the steering, and you are through.

The finish line flashes by, and suddenly you are in the pits. The car falls silent. You see your lap times being held up. Your final lap was a new lap record! At last, you permit yourself a small smile.

You have mastered this powerful car on a difficult track, driving with the assurance and precision that comes only from long hours of practice.

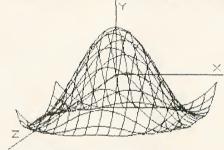
You are driving an authentic race car. You are playing REVOLUTION!

NOTE: graphics on 16K version are slightly different, 16K and 32K versions included on all cassettes.

SOFTWARE AUTHORS!

Inter+Action is looking for new software to market. We are especially interested in disk-based software for the TRS-80 Color Computer.

For more information, contact Inter+Action's Software Review Manager.



MATHMENU

MATHMENU is a powerful menu-driven system to turn your Color Computer into an intelligent, flexible tool for mathematics and engineering. MATHMENU takes the tedium out of math, leaving your full brain power to attack the "meat" of your problems. By rapidly performing integration and differentiation, solving quadratic equations, plotting user defined functions and much more, MATHMENU can help simplify the most complex problems. Whether you are a student or a professional, if you use math, you need MATHMENU.

MATHMENU For 32K Disk ... \$49.95 Plotting Requires
For 16K Cassette ... \$44.95 Extended Basic
Documentation only ... \$5.00
Or write for free brochure.

Connecticut residents add 7½% sales tax. Allow 2 to 3 weeks for delivery. *TRS-80 is a trademark of Tandy Corporation.





Never one to admit defeat, I wondered next what kind of resolution was possible. I thought I'd do some experimenting to find out.

Upper- and Lowercase

My first chore was to construct a table of dot matrix character representations. This wasn't too hard, as I had some descriptions of character-generating ROMs in my semiconductor manuals. Leafing through a manual from Retarded Micro Logic (RML), I came across the designs shown in Figure 2. In fact, Figure 2 is a modification of the RML designs. I wanted "descenders" on the lowercase characters. Descenders are the portion of the character that goes below the base line, if you remember advanced printing from P.S. 49.

You can see from the figure that each character is made up of five horizontal dot positions by eight vertical dot positions. The lowest dot row is blank, except in the case of descenders.

I now had the character "font" designed. Although it was a far cry from illuminated manuscripts and Baskerville, it was adequate. Now, how could I implement it?

A Graphics Table

I was attempting to define my own character set in software. The perfect place to use such a character set was in graphics pages rather than the text page that's used in the Color Computer for normal display. One of the nicer benefits from this scheme is that it would be easy to overlay graphics designs with text, something that can't be easily done in the Color Computer. Not only that, but why not use the same scheme to define unique graphics shapes defined by the dot matrix? Perfectly possible...

Table 1. Graphics Table Code

Code	Character	Code	Character
0-7	unused	44	,
8	Left Arrow	45	899
9	Right Arrow	46	,
10	Down Arrow	47	1
11-31	unused	48-57	0-9
32	blank	58	:
33	1	59	;
34	"	60	<
35	#	61	=
36	\$	62	>
37	%	63	?
38	&	64	(a)
39	,	65-90	A–Z (uppercase)
40	(91	Up Arrow
41)	92-96	unused
42	*	97-122	a–z (lowercase)
43	+	123-255	unused

I decided on the following approach: all the character combinations would be held in a graphics table of 256 characters. Each character in the table would consist of eight bytes, as shown in Figure 3, representing the eight rows of the character from top to bottom. The eight bytes would hold the 64 bits of an 8 by 8 dot matrix. The 5 by 7 dot matrix would fit inside the 8 by 8 matrix — a little bit of a space waster, but on the other hand, an easy format from which to access character data.

If the table held 256 characters at eight bytes per character, we'd have 256 by 8, or 2048 bytes. The table could be stored in "protected RAM" by using the Clear command after turning on the Color Computer. CLEAR 100,&H37FF, for example, clears 100 bytes for strings and protects the user RAM from &H3800 (14336 decimal) on, preventing Basic

from overwriting it.

All right so far. But how do we get the matrix data from Figure 2 into "encoded" form? I'd like to tell you that I got out my laser scanner and whipped off the values in 20 milliseconds, but I wound up going down each of the characters and translating them manually into decimal values.(What wouldn't I do for computing in the country?) The result is Program Listing 1.



PARENTS! Want to stimulate your child's learning? Let T.C.E. show you how!

SEE AND SPELL

CHILD'S FIRST SPELLER!

Program is fun & fascinating to use. Child simply enters the spelling of the word represented by the high resolution graphics. Color Computer 16K Ext. Basic.

\$19.95 tape \$24.95 disk

SAVE THE FISH™

CAN YOU SAVE THE FISH?

You must spell the mystery word before the whale eats the fish. Program has three levels of difficulty. First two levels you play against the computer (200 + words). Level three allows you to enter your own word. Tape \$18.95

Color Computer 16K Ext. Basic Atari 400/800 16K VIC 20 8K Expander Req.

FRIEND OR FOE MATH

READY FOR THE CHALLENGE?

As a radar operator, your job is to decide which planes are friend or foe. The code (math problem) is your only clue. All you have to do is match the number on the plane with the answer to the math problem.

Color Computer 16K Ext. Basic Atari 400/800 16K

Tape \$19.95

SPELL BOMBER™

A NEW TWIST ON HANGMAN!

As captain of your ship you must destroy the enemy bombers by spelling the mystery word. Remember, the bombers are getting closer on every try. Atari 400/800 16K

VIC 20 8K Expander Req. Color Computer 16K Ext. Basic



PROGRAMS HAVE BEEN CHILD, PARENT, AND EDUCATOR TESTED!

Call our 24 HOUR order line (301) 963-3848 Dealer inquiries invited

Additional Educational Software available for Color Computer, TDP 100, Atari®, Apple®, Commodore 64®, and VIC 20®. SEND FOR FREE CATALOG



T.C.E. Programs, Inc. P.O. Box 2477
Gaithersburg, MD. 20879 (301) 963-3848

VISA



Bill has found a way to put user-definable graphics characters into your favorite machine.





16K Extended Color Basic

WAS WORKING ON PORKBELLY, my Color Computer commodities analysis program, when I heard a knock on the door of my computer room. Opening the door, I saw my neighbor Engineer John holding a new Timex Sinclair TS2000. "Gotcha, Barden!" he grinned. "You're always bragging about your Color Computer. This baby will run rings around it!"

illustration by Rod McCormick

"Is that a computer or a new electronic watch?" I quipped, flipping off PORK-BELLY in the middle of Soviet grain estimates for 1984. I sighed inwardly. I knew a long discussion was coming. We had once spent two days arguing over the relative merits of the 6809E and 6502 microprocessors.

"No, I'm not kidding, Bill," he continued. "The TS2000 has user-definable character sets that are switchable from software. You can define any character you want! Can you do that on the Color Computer?"

I hemmed and hawed. "Yeah, sure you can — it's simply a matter of using a DRAW string to generate new characters..."

"Yeah, but I don't have to fool around with that on the TS2000," he went on. "I can define any 8 by 8 matrix of characters with one command. Furthermore, the TS2000 has lowercase, 24 lines per screen, and a 64 character per line capa-

by William Barden, Jr.

bility when used with a monitor," he concluded with a smug grin.

"Listen. I'll bet you a weekend in computer camp that I can do the same thing on the Color Computer," I challenged. The computer camp I was referring to had just opened in South Orange County and specializes in Timex/Sinclair, TRS-80, counterinsurgency techniques, and automatic weapons handling; it had proved to be a popular camp in this conservative pocket of California.

After my neighbor left, I started thinking about the problem. Why do I get myself into these things? Still, the idea of a weekend in the smog was appealing...

Dot's a Nice Display

First I had to refresh my memory on how the Color Computer actually displays characters and data.

The Color Computer uses a Motorola 6847 Video Display Generator (VDG) chip to display text and graphics. The VDG chip contains a built-in "character ROM" which defines text characters as a matrix of dots. It also lets each of the 256

(horizontal) by 192 (vertical) screen dots be individually programmed. A good description is found in *Color Computer Graphics* (Radio Shack 62-2076).

Dot matrix representation of text characters has been used for a long time. The first standard representation was a 5 by 7 dot matrix, shown in Figure 1. Later versions went to larger matrices for better resolution.

My first thought was this: Why not use a 5 by 7 dot matrix representation of characters and divide the screen into character positions of six pixels (dots) wide by eight pixels high? This would give 256/6, or 42, characters per line by 192/8, or 21, lines per screen — quite an improvement over the current specs.

When I tried a test case, I found that the resolution on a color television was simply not good enough to resolve a line that was only one pixel (1/256 of the screen) away from another. The characters had to be at least two pixels apart. I should have realized this from the beginning of course; you'd have to go to a monitor (see Dennis Kitsz's article in the March, 1983 issue of **The Color Computer Magazine**) to get that type of resolution. (You might keep the 42 characters per line by 21 lines scheme in mind, though, if you're using a monitor or thinking of upgrading to one...)

more



NEW ARCADE GAMES

GLAXXONS / EL BANDITO / COSMIC CLONES / BUMPERS

OTHER GREAT ARCADE GAMES

HAYWIRE / ASTRO BLAST / CAVE HUNTER / SPACE RAIDERS Arcade Games, Cassettes 24.95—Require 16K / Discs 29.95— Require 32K

ADVENTURE GAMES

CALIXTO ISLAND / THE BLACK SANCTUM Adventure Game Cassettes 19.95—Require 16K

Mark Data Products



Custom Color

Part 1 of the most incredible computer music software you've ever heard...

RANKLIN D. ROOSEVELT once told a story about campaign criticism. He recalled how he was attacked, his family was attacked, and those attacks extended as far as "even my little dog Fala." F.D.R. then explained that neither he nor his family minded criticism, but Fala did mind. Most days I agree with F.D.R.'s attitude, so when a recent letter to The Color Computer Magazine called me (in order) an egotistical maniac, biased, unfair, ridiculous, assinine (sic), and mentally disturbed, I might have felt rather complimented. This time, though, my reaction was like Fala's, because the letter took me to task for criticizing Speech Systems' music synthesis program "The Composer" in a re-

Well, G.B. in San Jose, this month's for you. Stuff this program in your computer and listen to how the Color Computer is really capable of sounding. Then write me again — and include your name and address!

Why Fala?

I reacted strongly to G.B.'s letter because I am first and foremost a composer, and my involvement with computers arose from and continues with music. So his letter, instead of remaining merely a provocative tirade, became a challenge. In the past I have published several sound routines for the TRS-80 Model I, but all have been monophonic (singleline) software; my polyphonic (multipleline) software has always required an external synthesizer interface or some hardware appendage. But the Color Computer has a more powerful microprocessor, and four-voice harmony and polyphony is at last possible. Limited, but possible.

This month's program, Color Quaver, can produce full four-part harmony and polyphony over seven octaves; has independently controllable timbre and envelope for each voice, and is in accurate, tempered tuning over its full range. The driver portion of Quaver is in Basic, and

by Dennis Kitsz

includes a music editor, waveform and envelope design system, Fourier transform waveform creation, tape save and load facilities, and a music compiler. The machine language execution routine ocupies only 580 bytes.

Some brief definitions are first in order; more details are given in the glossary. I use pitch, tone, and note interchangeably to mean a perceived musical frequency — a C-sharp or B-flat or D-natural, for example. A voice is a musical line, that is, a solo tune; harmony is the simultaneous playing of several notes; polyphony (also called counterpoint) is the simultaneous performance of several tunes. Polyphony is different from harmony in that the voices may have different rhythms, may start and stop at different times, and are generally unique and independent. High and low refer to pitch, loud and soft to volume. By timbre or quality, I mean the character of any note that identifies what produced it such as an oboe, a guitar, or an electric bass. Pitch differs from timbre in that pitch refers to the fundamental frequency, whereas timbre includes the fundamental plus all the related harmonics or partials which, when combined, give an instrument its "sound."

A waveform graphs the pattern of air or eardrum compressions and decompressions made during the course of a specific time period. Look closely at a record groove; it is a perfect example of a waveform preserved in plastic. For the most part, this article refers to the waveform of a single fundamental note's cycle. A spectrum is an intensity graph of all the fundamentals which, when combined, make up some audible event such as a car horn, bird song, rock band, symphony orchestra, or explosion.

Electronic music synthesis has added a few terms of its own to this discussion. The most important of these is envelope, which describes how a note starts, proceeds, and ends. A piano envelope has a sharp attack, quick initial decay, long sustain (if the pedal is pressed down), and slow release. A cello has a gentle attack, no initial decay, long sustain, and quick release. Most microcomputer music programs don't bother with envelope. The notes just start and stop, giving them a beeping quality.

Music and Computers

A desire to use computers for music has been around as long as computers have existed. Computers interest composers because they offer great control over the resulting music, without the need to explain the music to performers; they don't make mistakes; and they are flexible enough to produce a wide range of sounds — especially those for which no acoustic instruments yet exist.

Digital computers, however, don't find music to be native territory. Sound is a continuously changing phenomenon, with infinitesimally small gradations in volume, pitch, and timbre. No sense is as capable as hearing; hi-fi manufacturers produce equipment with distortion almost unmeasurably low — yet no sophisticated listener is ever fooled into believing that a recording is a live performance. Thus, digital musical hardware and software are among the greatest challenges.

To discover how to produce sound from a digital computer, it's important to explore both the process and the pitfalls of digital techniques. I'll start with the simplest of all waveforms, shown in Figure 1. This is a sine wave, a pure tone with no harmonics. There is no way a digital computer can store this precise, continually changing waveform. Instead, the waveform is "sampled" at regular intervals, and the discrete values (voltage, intensity, or whatever) are stored in the computer as a series of numbers. Figure 2 shows the wave and sampling points; in this case, a full cycle consists of only ten samples.

more

Whatever you call it, you can strike up the band, beat the drums. Problem solving with the computer will never be hard again, for now there's EQN!

What does EQN do? Up to 10 pages and 80 user definable fields make visible calculations easy.

EQN is not a spreadsheet. **EQN** is a dramatic new approach to the use of the computer. Thousands of uses!

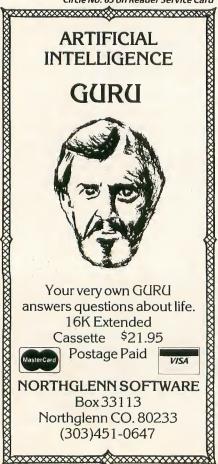
ASK YOUR SPREADSHEET FOR THESE FEATURES:

EASY TO USE, vary command, creates tables, edit definitions, use comments, field definitions to 150 char., expandable, formulas may be stacked with colon, +, -, *, /, SIN, COS, TAN, ATN, EXP, LOG, INT, ABS, DEF, FN, Power, Parenthesis, insert or delete categories.

NEED WE SAY MORE!
All pages and tables output to printer.
Available on cassette. 16k ext.
\$34.95. Check or money order
Jackson Taggart & Jackson
Route 1, Grants Chapel Rd..
P.O. Box 93,
Adams, Tennessee 37010
(615) 358-2635

++++++++++++++++++++++

Circle No. 65 on Reader Service Card



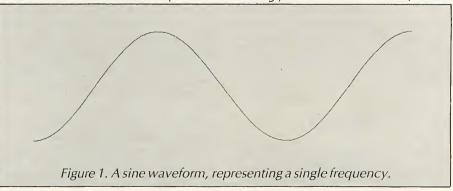
Now look at Figure 3. Each stairstep represents the fixed digital value stored to represent the sound. A higher sampling rate (say 20 or 30 samples per cycle) would provide a more detailed picture; a lower sampling rate would decrease the accuracy of representation. The note can then be re-created by sending the computer's binary information to a digital-toanalog converter (D/A converter or DAC), which puts out a voltage proportional to the binary input. Figure 4 shows digital information changed to a sine wave output through a six-bit D/A converter — the size used in the Color Computer. The resulting waveform is made up of stairsteps, exactly like the numerical representation. The audible effect of the stairsteps can be filtered out with a tone control or an equalizer if the sampling rate is fast enough.

Therein lies the problem. A fast sampling rate is critical to good synthesized sound. Imagine you're traveling along the highway trying to keep track of your mileage, but the only dashboard gauge that works is the tenths of a mile counter on your odometer. You assume that if you check often enough — once each half mile or so — you can mark down the tenths on a piece of paper. When you arrive, you merely take the difference between each tenth value and the previous

tenth value, and add them up. But maybe it's been a hard day, and your time sense isn't as keen as it should be. You're actually checking each mile or so. When you get to your destination, you add up the mileage and you're way off—by half!

Now imagine instead that, as you travel, your previous tenth marking is always the same as the new one. Was it one mile or two? Or three? Or fifty? Or is your odometer completely broken now? It turns out that your sampling rate was exactly the same as the odometer's frequency of repetition, so your information is useless. Look at Figure 5. Since sine waves are symmetrical, a sampling rate of one-half the tone's frequency results in the same complete lack of useful data. It looks like a straight line — no sound at all.

Having no sound is almost preferable to what happens when the sampling rate rises to more than half the frequency being digitized. Not only is the sound you want to store lost, but a new frequency — an alias frequency — is produced by the digitizing process! Figure 6 shows how this looks. By keeping the sampling rate high enough, and by filtering out all frequencies of more than half that rate, excellent sound is produced. Since the aliasing process works in reverse, it's im-



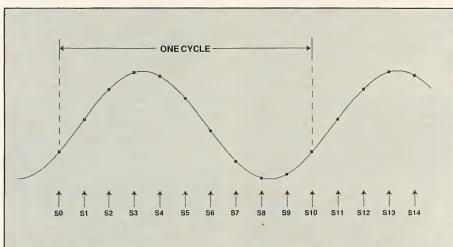


Figure 2. The process of sampling the sine waveform shown in Figure 1. One cycle is sampled ten times in this example.

portant not to put out any frequencies of greater than half the output sampling rate. In fact, the recently introduced digital Compact Disc players perform 44,100 samples per second, giving a full hi-fi frequency range of 20 to 20,000 Hz.

Microcomputers can keep up with this rate on a strictly "through-put" basis, but don't have enough memory to store the music. At 44,100 samples per second, 5.3 megabytes of storage would be required for each minute of music! In fact, even to sample and play a single waveform repeatedly can only be done at about a 20,000 Hz sampling rate on the Color Computer.

The main dilemma: economy of programming to optimize sampling speed.

Tuning Up

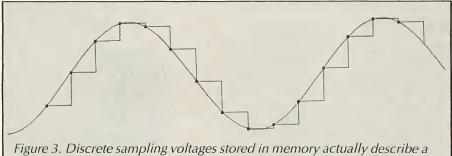
The whole process of outputting a series of voltages that produce an audible pitch (when taken as a fast, continuous stream through an amplifier) is straightforward. The problem, then, is developing computer software which, given descriptive information (note name, octave, length, etc.) can *create* sound smoothly and quickly enough. Without smoothness — irregularities in timing, processor interruptions, etc. — the pitch will waver or an unpleasant

"gargle" will be heard.

Quickness is an even more severe requirement. First, I'll describe how a pitch is produced that is consistent, and then deal with the restrictions that speed imposes.

There are two possible ways of achieving different pitches: through varying the speed of the waveform table output to the D/A converter, or through varying the samples selected from a waveform table. The first solution presents several difficulties, including the difficulty of creating in-tune software, and the need to "pre-compile" each pitch, chord, dissonance, etc., into a unique waveform table. The second solution also presents problems, but the software can be reduced to a minimum configuration. In fact, the result shown in Listing 1 (excluding the set-up and return to Basic and presented in Part 2) is only 264 bytes.

It's time for the odometer analogy again. When do you change your car's oil, for example? Every five thousand miles, perhaps. How often is that? The answer depends on how much you drive. If you drive a great deal, then, if you are conscientious, you change your oil quite frequently. Here's another example. If you have guests — meaning higher coffee and tea consumption, more dish washing, more baths or showers — the



stair- step waveform rather than the continuous, sine-wave original.

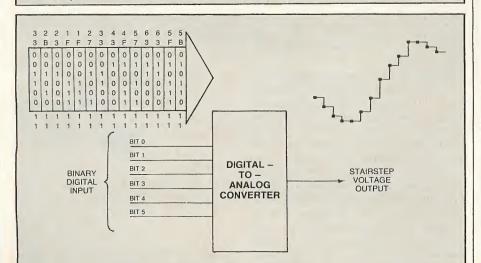


Figure 4. Binary data entering a digital-to-analog converter is transformed back into a stairstep version of the original sine wave.

P.O. Box 16842 — Sta. B Greenville, South Carolina 29606

(803) 233-2700

PRESENTS

COLOR—STICK

The ORIGINAL interface for the TRS-80*
Color Computer to let you use the famous:

ATARI* JOYSTICK'

Just plug your Atari or Atari like joystick (the Color-Stick enables the use of most joysticks made for the Atari) into the Color-Stick interface and then plug the Color-Stick into an empty joystick port.

The Color-Stick can improve scores 50% and more while making some games more exciting and fun to play.

Don't settle for cheap imitations. Only the **ORIGINAL** Color-Stick's small inline design allows you to just plug your joystick into it and forget it. The Color-Stick becomes a part of your joystick so it does not interfere with your game playing. In addition Color-Stick returns a full value of '63' for the right and down directions, even when using two joysticks and even in the diagonal directions, the others don't.

NOW Color-Stick has a new low price......

Color-Stick interface \$10.95 each two for \$19.95 (less joysticks) Atari joysticks \$9.95 each

BETTER OFTWARE COMPANY

P.O. Box 16842 — Sta. B Greenville, South Carolina 29606 (803) 233-2700

Don't miss out order the ORIGINAL. Send your check or money order or better yet call today and order your Color-Stick.





Add \$2.00 per order shipping and handling. Bank cards welcomed (please include expiration date). Orders paid by cashiers check, money orders, bank cards and C.O.D. are shipped within 48 hours. Personal checks please allow 1.2 weeks. C.O.D. orders add \$1.50 extra. S.C. residents add 4% sales tax. *TRS-80 is a registered trademark of Tandy Corp. Atari is a registered trademark of Atari; Inc.



Circle No. 68 on Reader Service Card

SATURN

9525 Vassar Ave. #C2 Chatsworth, CA 91311

4K Color Computer	3/U
rive 0 \$	345
rive]\$	245
adio Shack Disk Controller \$	160
D CoCo Controller \$	150
xtended Basic ROM \$	
ATURN RS-232C Port Expander \$	30
ower-on LED Kit \$	6
ont Reset Switch Kit \$	7
ATURN Joysticks (each)	\$15
iskettes Starting at	22
PROM Eraser (U.V. Light)\$	50
THE INTRONICS EPROM PROGRAMM	

Program your favorite EPROMs, quickly, accurately and inexpensively. This versatile unit "burns in" binary or Basic programs into an EPROM. Protect your Basic software from being listed. Introductory Price\$110

SATURN
ELECTRONICS COMPANY INC
57-61 Cloverdale Boulevard
Bayside, New York 11364

To order call: (212) 423-4626 (212) 423-0796 COCO I BBS COCO II

(212) 423-8087

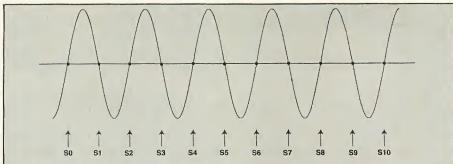


Figure 5. A sine wave sampled at exactly half its frequency appears to the computer as a straight line, and is therefore useless.

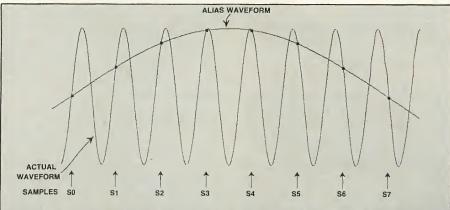


Figure 6. A waveform sampled at a frequency of less than half its frequency pro duces an alias waveform that is artificial, audible, and unpleasant.

water pressure will decrease more quickly, and the water pump will kick on with greater frequency.

That's the key word: frequency. Rather than speed up the waveform by changing the processor's output rate, it is easier to change the speed of the "spinning" waveform table. Imagine now that the program's pitch counter is an odometer, and look at Figure 7. It is a counter running from 0 to 65535. The counter is maintained in binary for two reasons: first, that is the natural domain of the digital computer; and second, it offers greater accuracy because the lower byte "carries" into the higher byte every 256 counts (not merely every 100, as decimal does).

A series of 16-bit values representing the notes from A through G-sharp are stored in memory. When a note is to be played, the program determines the note, takes its value, and adds that value to the "note odometer" in Figure 7. The most significant half of the note-odometer reading is used as the least significant half of a computer address pointing to an array that stores the waveform. The most significant half of the waveform pointer is always the same, meaning the table loops around to the start whenever the least significant half of its address exceeds hex FF. It looks like Figure 8, which shows samples taken from a circular waveform table.

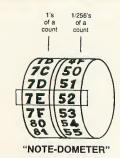


Figure 7. A high accuracy note counter can be created by advancing a 16-bit offset and using only the most-significant half.

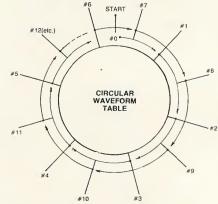


Figure 8. A circular waveform table permits the program to loop through at any speed, picking out the wave table samples it needs.

(212) 423-4623

The table starts at zero, and the note's pitch value is added to the counter. A sample is taken at number 1, the pitch value added again, and another sample taken at number 2. Figure 9 is a sine wave with 53 sample points. Now follow me carefully here. Let's say the waveform table is gone through one step at a time during the sampling period. That means the full waveform is output, as expected. What happens when the pitch counter is increased by two instead of one? Remember that we're dealing with a circular table, and look at Figure 10. Every other sample is output. The table is gone through twice in the same sampling period. The apparent frequency of the waveform is twice the original — an oc-

By using a fractional counter (counting in one's and 1/256's), the integer part of the counter plucks a real sample from the waveform table. The fractional amount keeps it honest, preventing the frequency from "creeping" flat in upper octaves.

Toot, Whistle, Plunk and Boom

Several music programs produce convincing pitches. Most are in tune. But still, they lack two important musical qualities: timbre and envelope. Timbre is easiest; I'll cover that first.

Timbre, or quality, can actually be analyzed as a series of sine-wave har-

monics added to a sine-wave fundamental. It can be achieved precisely by mathematical calculation, or very roughly by drawing the waveform. Both can be musically satisfactory, and both are available using the Quaver Basic driver.

The mathematical calculations (called a Fourier transform) involve applying sine and cosine functions to a frequency spectrum. These functions form the link between the spectrum (a frequency representation) and the waveform (a time representation). It is possible, by knowing an instrument's frequency spectrum, to define very precisely what that particular timbre will sound like on the computer.

Envelope is a simple concept, but tricky to implement. It's easy to imagine how a note might start and gradually fade away, or follow any other pattern of volume changes. But what if one note begins to fade as another one starts? In acoustic music, this happens more often than not

The computer must keep track of not only a note's pitch, timbre and duration, but also its instantaneous intensity. And it must do this for *four* notes, each changing at its own rate. The process is one of summing and averaging, but all the math has to be done at a high speed. Before explaining the machine language program in detail, I'll describe how to use Quaver. Tune in next month.

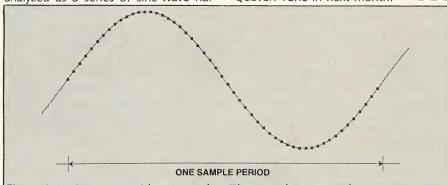


Figure 9. A sine wave with 53 samples. The samples are used to create a waveform table.

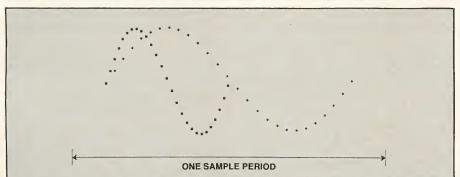


Figure 10. Passing through the sine wave table using a two-sample offset produces an octave with the same waveshape. As the pitches get higher, the waveshape gradually deteriorates, containing less and less of the original wave shape.



STEAL THE BEST PROGRAMS

The best out of our library of over 200 published programs, packaged and priced so low that it seems like robbery:

Games #1 - Action-packed, logical, and colorful ones! Flyby, Blackjack, Motorcycle, Germ, Blockade, Life, Diggem, Robot Run, Stellar Empire, and Zero G for your fun and pleasure!

Adventures #1 - Trips to far-off and dangerous places. On the agenda are Jerusalem Adventure, Ultimate Adventure, Williamsburg Adventure, House Adventure, Andrea Doria Adventure, Blackard's Castle, and Realm of Naugal

Practicals #1 - Programs for text editing, maillists, budgeting, filing, etc. including Keeptext, Keep Address, Keeplist, Keepcheck, Keep Budget, Files, and Tape Inventory.

Graphs & Charts #1 - For data manipulation and display! Do it with Pie Chart, Bar Chart, XY Graph, Curve Fit, and Two Dates.

Choose any one of the four packages for just \$12.00 [\$17.00 on disk]!



a lot of software for a little silver

See your dealer or: Write or call us direct at P.O. Box 21101, Santa Barbara CA 93121 (805) 966-1449

One-Finger Hexload



by Jim Norman

N AN EFFORT to be user-friendly, some monitor programs force you to respond to questions and type &H each time you want to enter a hexadecimal value. This is especially annoying when you want to enter the hexadecimal machine code of a relatively short program like Steve Odneal's "Reformat Your Video," (see the April 1983 issue). the INPUT command is at fault. You see, INPUT is so powerful it's hard to turn down the temptation to use it. When a command such as INPUT "WHAT IS THE NUMBER"; N is executed, it prints the request and supplies the question mark.

Then the Basic itself helps you enter the number. It can be in decimal (normally) or it can be in hex if you preface the number with "&H". Basic then lets you type, backspace, and correct until you get the number you want and hit the Enter key. If you typed in a hex value Basic understands it without need for conversion. And, it does all these wonderful things automatically. Not using the INPUT command means having to program all these functions yourself. But doing so also lets you enter hex bytes in two single keystrokes — quite an improvement from before! It would sure make short work (or shorter anyway) of the video reformat program. With all of this in mind, I wrote "One-Finger Hex-

User Instructions

When "One-Finger Hexload" starts up, it requests a four character starting address with a dollar sign prompt (\$????) to indicate the desired input is in hex. When exactly four valid hex keys (0 - 9)A - F) have been typed, the program automatically goes to the specified address, takes a PEEK, prints the address and its contents, and waits for further response. To store a hex byte at this address, type two valid hex characters — no Enter is necessary. The program will POKE the byte, increment the address, PEEK and display, and wait again. Thus, you can continuously store a list of bytes with only two keystrokes each. There is no more efficient way to do it!

Just this two-stroke store would be helpful, but other features are included to make "One-Finger Hexload" a more helpful general-purpose machine language editor. If you look at the reported PEEK value and don't want to change it, or just want to advance the address. type Down Arrow, or Space, or Enter when the program is waiting for a byte. If you want to go the other direction (decrement the address), type the Up Arrow or slash mark. If you see that you have typed the first of the two hex characters wrong, then the Left Arrow or comma lets you backspace-delete and try again.

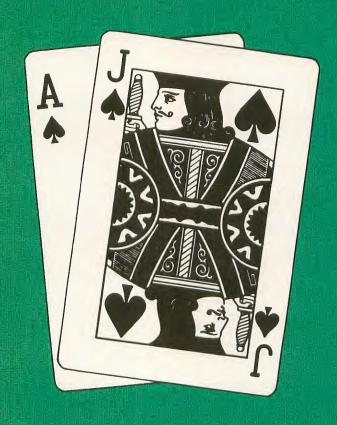
If you inadvertently type a non-hex key during address input, instead of ignoring it (you might not notice!) the program reinitializes the address request. If you strike a non-hex key during byte input you get a "!!" error display, and the program goes again to the same address giving you another chance. Also, after POKEing the given byte, the program quickly PEEKs to see if the byte made it. It won't have if you are POKEing defective RAM, any ROM, and some types of I/O (or if you are trying to get a new piece of hardware up that hasn't made it yet). If the POKE didn't work you'll get an error message (??), the address will increment, and the program will go on. Finally, at any time while entering bytes the @ key will call up the new address prompt and let you easily go to a new address with just four keystrokes. I find this particularly useful for checking my work and otherwise tooling around memory.

Program Description

"One-Finger Hexload" is extensively documented so you can follow the details if you want, but here is a brief description of how it gets around using the INPUT command. PRINT is used to prompt a four-key starting address. A subroutine that uses INKEY\$ loops is called four times to get the keystrokes, and prints them at the prompted spot. This subroutine calls another subroutine that converts the hex keys to numeric values (and returns an F=16 error code on illegal keys). The four key values are then used as hexadecimal powers multipliers to determine the total starting address. A PEEK finds the current value at that address. A PRINT reports the address and contents and prompts the byte input. An INKEY\$ loop gets the first character of the input byte, and control codes are checked. The subroutine to convert keys to numbers is called and the key is printed at the prompted location. The second key is handled much like the first, and the byte value is then computed from the two-key information. The byte is then POKEd and checked, the address is incremented, and the process begun again.

So, user-friendly sometimes has its points, but when storing or editing lists of hex bytes nothing beats a little old-fashioned dedicated programming. If you work with assembly language or machine language, you need a keystroke-efficient hex loader. Since writing "One-Finger Hexload" I have found it to be my most used utility. I hope it helps you as much as it has helped me. Now, if you skipped it in April, go back and type in "Reformat Your Video" in hex. It will be worth it!

Circle No. 69 on Reader Service Card



This is not a game.

Introducing BLACKJACKPRO. The computer aided learning tool that teaches you to BEAT THE HOUSE.

BLACKJACKPRO is not a game. It is serious business.

This tutorial will teach you the probability based system that expert players have been using for years.

Phone orders may be placed 24 hours a day by calling (212) 582-2006 or (613) 594-7855, or toll-free at 1-800-223-6015.

Mail orders and requests for information should be sent to

SKILLWARE CORPORATION

Applied Probability Dept., 2nd Floor

314 West 53rd Street New York, New York 10019

BLACKJACKPRO is a trademark of SKILLWARE CORPORATION. IBM, APPLE II, and TRS-80 Colour Computer are registered trademarks of International Business Machines Corp., Apple Computer Inc., and Tandy Corp.

BLACKJACKPRO simulates actual game situations to condition you to make the right play effortlessly.

By patiently correcting your, mistakes, BLACKJACKPRO teaches you the multi-level decision-making process that will make you a lifelong winner.

BLACKJACKPRO will pay for itself. You will be a WINNER and go UNDETECTED.

The introductory price is \$75. Versions are now available for the IBM PC®, APPLE II®, and TRS-80 Colour Computer®.

Why wait? We're ready to take your order.

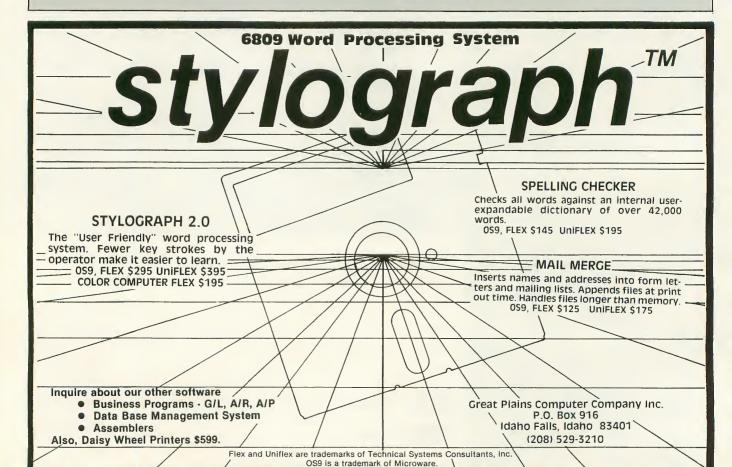
	_ BLACKJACKPRO tutorials @ ☐ TRS-80 Co. Co. Diskette	
		C.O.D. orders gladly accepted (\$2.00 additional). Please allow two
City	State Zip	weeks for
	Exp. Date	personal checks to clear. N.Y. State residents please add sales tax.

Program Listing. One-Finger Hexload

- 20 PRINT "<@> CALLS NEW ADDR-4 C
 HAR ONLY."

 30 PRINT "<DOWN ARROW>, <SPACE>,
 AND <ENTER> ADVANCE
- ADDRESS."
- 40 PRINT "<^>AND</> STEP ADDR. B ACK ONE."
- 50 PRINT "<LEFT ARROW> AND <,> D ELETE ERRONEOUS 1ST KEY IF NEEDED."
- 60 PRINT "<!> ENDS PROGRAM EXECUTION."
- 70 PRINT "'!!' INDICATES ERRONEO US ENTRY"
- 80 PRINT " -ADDRESS DOES NOT ADVANCE."
- 90 PRINT "'??' SAYS STORE DIDN'T WORK."
- 110 PRINT "VALID ENTRY IS 2 CHAR . HEX BYTE"
- 130 CLEAR 50: PRINT "START ADDR: \$????"

- 140 COUNT=0 'INIT: WILL BE 4. 150 '
- 160 'GET FOUR ADDR. KEYS.
- 180 GOSUB 760: FIRST=F
- 190 GOSUB 760: SECOND=F
- 200 GOSUB 760: THIRD=F
- 210 GOSUB 760: FOURTH=F 220 A=FIRST*4096 + SECOND*256 +
- THIRD*16 + FOURTH 'MAKE ADDR
- 230 J=PEEK(A) 'PEEK AT ADDRESS.
- 240 PRINT "\$" RIGHT\$("000"+HEX\$
 (A),4) " " RIGHT\$("0"+HEX\$(J),2)
- 250 '
- 260 'GET MSB HEX KEY.
- 280 U\$=INKEY\$
- 290 IF U\$="" THEN 280 'KEY YET?
- 300 S=ASC(U\$) 'ASCII VALUE?
- 310 '
- 320 'CHECK FOR CONTROL CODES
- 340 IF S=13 THEN 670 '<ENTER>?
- 350 IF S=94 THEN 680 'UP ARROW?
- 360 IF S=10 THEN 670 'DOWN ARW?
- 370 IF U\$=" " THEN 670 'SPACE?
- 380 IF U\$="/" THEN 680
- 390 IF U\$="!" THEN END



400 IF U\$="@" THEN 130 440 F\$=U\$: GOSUB 860: IF F=16 THEN 690 ELSE U=F 450 PRINT @458,U\$ 'PRINT OK KEY 470 'GET LSB HEX KEY. 490 L\$=INKEY\$ 500 IF L\$="" THEN 490 510 S=ASC(L\$) 'ASCII VALUE? 520 IF S=8 THEN 710 'LEFT ARROW 530 IF L\$="," THEN 710 'BKSP 'CHECK FOR PROPER HEX KEY. 570 F\$=L\$: GOSUB 860: IF F=16 THEN 690 ELSE L=F 580 PRINT @459,L\$ 'PRINT OK KEY 590 H=U*16+L 'CALCULATE VALUE. 600 POKE A,H 'DO THE STORE! 610 620 'CHECK TO SEE IF GOT THERE. 640 CHK = PEEK(A)650 IF CHK<>H THEN 660 ELSE 670 660 PRINT @460," ??" 'DIDN'T 670 A=A+1: IF A>65535 THEN A=0: GOTO 230 ELSE 230 'INCR, GO 680 A=A-1: IF A<O THEN A=65535: GOTO 230 ELSE 230 'DECR, GO 690 PRINT @458,"!!" 'ERROR MSG. 700 GOTO 230 'TRY OVER, NO INC.

710 PRINT @458," " 'DO BKSPACE. 720 GOTO 280 'TRY SAME AGAIN. 1 ********* 730 740 'SUB: GET, PRINT, ADDR. CHAR. 750 ************** 760 F\$=INKEY\$ 770 IF F\$="" THEN 760 'GET KEY. 780 GOSUB 860 'CONVERT TO HEX. 790 IF F=16 THEN 130 'NG:DO OVR 800 PRINT @(461+COUNT), HEX\$(F) 'PLACE CHAR IN CORRECT SPOT 810 COUNT=COUNT+1 'RDY FOR NEXT 820 RETURN ***************** 830 840 'SUB: CONVERT KEY TO VALUE 850 ************** 860 F=16 'DEFAULT: NOT HEX KEY. 870 H=ASC(F\$) 'CONV KEY TO NUM. 880 IF ((48<=H) AND (H<=57)) THEN 900 'IS A NUMBER? 890 IF ((65<=H) AND (H<=70)) THEN 920 ELSE RETURN 'A LTR? 900 F=H-48 'VALUE OF NUMBR KEY. 910 RETURN 920 F = H - 55'VALUE OF LETTR KEY. 930 RETURN

by Macrotron

Lowest Price Ever on the Professional Keyboard -\$59.95!

No soldering, cutting, or gluing required — plugs right in!

New, improved version — better layout, lighter touch. (See photo)

High quality construction assures reliable operation.

Versakey — a Multifunction Keyboard Driver Utility — \$9.95 Special! FREE with

• Autorepeat, n-key rollover and type-abead.

either keyboard!

Auto repeat, n-key rollover and type-ahead

May define up to 128 strings of up to 80 characters each

F1 functions as DEFINE, F4 as CTRL

Supplied on cassette, may be copied to disk

Assembly language source listing included

Introducing the Premium Keyboard — \$89.95

Lower profile than the Professional

Extended Radio Shack layout

Silk-smooth feel — uses ALPS keyswitches

Keyboards carry a 90-day limited warranty. Include your computer's PC board type, if known. Otherwise, include the complete catalog number and serial number.



Micronix Systems Corporation

Our New Address: 8147 Delmar St. Louis, MO 63130 (314) 721-7969

Terms: Prepaid check or money order, Mastercard or Visa. Shipping Charges: U.S. \$2.00, Canada \$4.00, COD \$3.50 (No CODs to Canada).



I'm thinking of buying a Mannsmann Tally MT160L printer for my Color Computer. Can I connect it to my computer with no additional interface? Should I expect a problem finding or making a cable? Will I be able to use the full potential of both printer and computer? Can I use and print information with my CompuServe ROMpak?

- W.B., Everett, WA

Yes. A little. Sort of. I don't think so. Silliness aside, I used an MT160L with my Color Computer for several months. The only additional hardware you'll need, since the MT160L comes with RS-232 and parallel interfaces, is the cable from the Color Computer to the printer. The cable supplied for RS-232 by Radio Shack for the Color Computer is wired incorrectly for use as an RS-232 printer cable. It can be easily fixed, or you can build one yourself just as quickly and cheaper too!

To make the cable you need the Radio Shack Color Computer printer cable (four-pin DIN to four-pin DIN, number 26 – 3020, \$4.95), a D-subminiature male connector (276 – 1547, \$2.99), the D-subminiature hood (276 – 1549, \$2.19), a soldering iron, a little solder, wire cutters, and a screwdriver.

Cut one DIN plug off the printer cable, and remove the covering from the four exposed wires, then strip about 1/4 inch of insulation from each wire. Solder the DIN pin 2 wire (green) to pin 20 of the D-connector. Solder DIN pin 3 wire (red) to pin 7 of the connector. Solder DIN pin 4 wire (white) to pin 3 of the connector. Check your soldering for accidental bridges to adjacent pin connections and make sure the solder joints are solid and clean. Put the hood in place and screw it together. You're finished with your cable. Plug it in and try it out. If you have

problems, use a volt/ohmmeter to make sure that pins 2 and 20, 3 and 7, and 4 and 3 are connected, and no others (it's possible that the colors are connected to different pins than I've indicated, but all the cables I've seen so far used the colors I specified).

If you would rather alter the Radio Shack cable (26 – 3014, \$19.95), you'll need a screwdriver and a pair of pliers. Take apart the hood of the RS-232 connector and use the pliers to pull the wires from the connector (make sure you grip the metal pin and not just the bare wire). Now push the white wire's pin into the connector hole labeled 3, push the red wire's pin into hole 7, and push the green wire's pin into slot 20. Re-assemble the unit and test it out. If it still doesn't work, test it for correct wiring.

For either of these methods to work, make sure the printer is set to the default settings of your computer. If you have Color Basic version 1.0, they are seven bit words, two stop bits, no parity. Color Basic 1.1 uses eight bit words, one stop bit, and no parity.

The printer is much faster than the computer, but you can set the printer to higher baud, and use POKE from Basic to speed up the computer's baud. The other printer features can easily be accessed with the proper software.

The CompuServe ROMpak sold by Radio Shack doesn't provide for printer output of data received. For that you'll need a smart terminal program.

I have a 64K Color Computer with one Tandon drive and a Radio Shack disk controller. The problem is that the computer seems to turn itself off. The screen goes to regular TV snow and I lose all keyboard communication. Sometimes it happens after several hours of use, sometimes right after power-up. Turning the computer on and off will eventually get it to work, but once it blinks off it usually happens several times before the computer will work properly for any length of time.

- E.K., Baltimore, MD

Your power supply sounds like the culprit to me. The Radio Shack controller draws its power from the Color Computer power supply. I think the power supply's performance may be marginal. Adding the disk controller pushed it too far and a component gave out. Now the component works only when it wants. My suggestion is to take it to a Computer Service Center and ask the technician to take a look and give you an estimate on repair cost.

I've read several articles about 64K modifications and they all seem to hinge on the use of a DOS. I plan to purchase disk drives in the future. How can I use 64K without disks? Is there a way, either software or hardware, to transfer the contents of ROM to RAM, and possibly compress the amount of memory ROM uses? How can I use the memory addresses assigned to the ROMpaks after I've upgraded to 64K?

-L.O., Vancouver, WA

You don't need a DOS to use 64K in a Color Computer. Page Plus (Skyline Software, 442 Sunnyside, Wheaton, IL 60187, (312)260-0929, \$27.95), lets you use 56K of RAM with Basic via memory banking techniques. The same company sells 64K Boot/Pager (\$19.95), which lets you manually page between two banks of 32K RAM, and will copy ROM to RAM so you can modify it. Micro Technical Products (123 N. Sirrine, Suite 106B, Mesa AZ, 85201 (602)834-0283), sells PLUS32 (\$15) which moves Basic from ROM to RAM for your modifications.

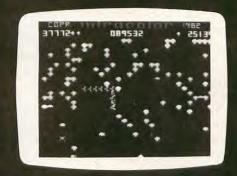
When you're in 64K RAM mode, without Basic, address the memory the same way you do anything else in machine language. If you're using Basic in 64K mode you have to use the PEEK and POKE commands, or machine language jumps (EXEC) to address those locations above Basic. Basic itself can't use anything above 32767.

to page 102

Setting The Standards

WHAT THEY ARE SAYING ABOUT COLORPEDE

"...forefront of the pack..." the Rainbow, Dec. '82"...an outstanding offer." N. Vernon, IN "...the best graphics I have seen to date." Erie, PA
"It is great!" Dayton, OH "...the best graphics and playability of any color computer game..." McKeesport, PA



COLORPEDE

This truly outstanding engineer designed, 100% machine language game with multi-colored high resolution characters and fast action will challenge the most avid arcade buff. Can be played by 1 or 2 players controlled with joy sticks or key board. Joy stick control is fast, smooth and accurate. As COLORPEDE slithers through the toad stools, you attempt to destroy the COLORPEDE, knock out the menacing Bouncing Bug and eliminate toad stools while accumulating higher and higher scores. Demonstration mode with top 5 scores. Pause feature. For 16K Color Computer and TDP-100.

Cassette-\$29.95

Disk-\$34.95



ROBOTTACK

Ultra fast arcade action with colorful high resolution graphics. You are the super human who must fight off the attacking robots and save the remaining humans from destruction. You have super powers, can shoot in any direction and move anywhere on the screen to accomplish your vital mission.

Engineer designed, 100% machine language. Can be played by 1 or 2 players with joy stick control. Top 5 scores displayed. Pause feature. For 16K Color Computer and TDP-100 with joy sticks.

Cassette-\$24.95

Disk-\$27.95

TO ORDER:

VISA, MASTERCARD, Money Order. Please allow 2 weeks for checks. Add \$1.50 for shipping, \$3.00 outside U.S. 4% tax in Mich.

intracolor

P.O. Box 1035, East Lansing, MI 48823 (517) 351-8537

COMMUNICATIONS

DEFLISR

from page 100

I purchased Radio Shack's Scripsit based on your March word processor review, and I want to tell you that Scripsit won't print properly from the disk to the printer (the spooler function) with non-Radio Shack printers (I bought it for the spooler function). It generates miscellaneous characters in the printed copy. I checked with the local Radio Shack Computer Center and found that they know of the problem, but they don't intend to correct it since there isn't a problem with Radio Shack printers. Yet, the advertisements say it will work with any serial printer.

The error has something to do with bit errors, and it only occurs at the buffer breaks when the computer goes to the disk spool file for more characters.

-R.C., Winter Park, FL

I'm sorry you're having difficulties with Scripsit, especially since you bought it for the spooler function. You don't mention the brand of printer you're using, but is it possible there might be a switch setting

to eliminate the problem? After looking at your sample print-out, it looks like the printer is losing the characters when Scripsit slows down for disk I/O. Have you contacted the printer manufacturer for advice? I don't know if Scripsit is entirely to blame, since it works with my non-Radio Shack printer.

Radio Shack should add a disclaimer to their advertisement that not all serial printers will work with Scripsit. If you can't solve the problem, you can return Scripsit to Radio Shack and ask for a refund since it won't work properly with your system.

I have a 32K Extended Basic Color Computer. I understand this means I have 64K chips that allocate 32K to ROM and 32K to RAM. Bob Rosen's article (March 1983) gave me the hope of upgrading my RAM to 64K. Can I upgrade my RAM from 32K to 64K? Or is 32K ROM and 32K RAM all I can get from my computer?

-J.C., Ruston, LA

Your computer may already have 64K RAM, you just can't access it. If you have the latest board, all you need is software (such as Telewriter-64 and Super Color Writer 3.0) to access the full 64K capability. If you have an earlier board, you must have a Color Basic 1.1 ROM (type:EXEC 41175, or PRINT PEEK(41301): a response of 49 means you have version 1.1). You'll also have to make sure the SAM chip is properly wired to address the extra RAM (if you have Color Basic 1.0, then it isn't). If it isn't, you have to cut traces and solder wires for the modification. You may also have "half bad" 64K chips instead of good ones.

For a complete set of instructions, see Dennis Kitsz' October "Custom Color," in which he gives all the changes required by the various boards for upgrading to 64K capability.

I have 16K Extended Basic with a "D" board, and I want to upgrade it to 64K.

— J.R., Munford, TX

0

0

0

0

0

0

0

0

0

0

0

0

See previous letter.

EDUCATIONAL SOFTWARE

DR. STAN - uses a new learning concept to teach spelling • it uses the child's spelling list • field tested, 85% success rate. Cassette: \$39.95 Disk: \$45.95

BASIC MATH - helps teach how to add, subtract, multiply, divide Cassette: \$19.95 Disk: \$25.95

DR. ADLIB - helps teach parts of speech and reinforces by using them

in sentences created by the child.

Cassette: \$19.95 Disk: \$25.95

Send stamped self-addressed envelope for **FREE** program (specify system) All programs user friendly, in BASIC, and Reg: 16K

DEE PEE DATA P.O. Box 11349 Columbia, SC 29211

24 HR. - TOLL FREE: 1-800-327-0560 in FL: 1-800-432-8859 (on a touch tone phone dial ext: 1520)

• Dealer and author inquiries welcome!

WE PAY SHIPPING . COD ORDERS ACCEPTED



0

0

0

0

0

0

0

0

0

0

0

0

I want to upgrade my DMP-100 printer to a DMP-200. Is it possible? I've tried selling it, and using it as a tradein to my dealer without success. Can you help?

- W.M., Freeport, IL

can look into memory and put things in selected locations, but when and why would I want to do this? What are such operations good for? How can they be used?

Finally, I have a revision C (1.0) board, how do I upgrade to 64K?

— L.G., Columbus, OH

ment. That should eliminate the problem of crashing on a BR error. Hope that helps.

See previous letter for info on upgrading to 64K.

You can't upgrade the printer to a DMP-200, at least as far as I know. Have you tried advertising in the want ad booklets as well as newspapers? If your dealer will let you, post a For Sale note at his store.

I do a lot of direct access file work and I'm constantly plagued by crashing programs when I enter a non-existent record address. Can I make an "on error, do something" (other than crash) routine that could be incorporated into the program or the operating system?

The Radio Shack manuals give poor explanations on how to use PEEK and POKE. I understand they

First, why are you entering non-existent record numbers? In direct access files, a non-existent record number must be either less than one or greater than the number of records in the file. All other numbers are valid. You need to use standard error checking methods on your record numbers before you try to use them in a Get statement. Checking for less than one is easy, but how do you know if the record number is too large for the file? This is accomplished with the LOF (buffer number) command. Every time this command is issued, the operating system calculates the highest record number in the disk file. A simple statement of: IF LOF(x)<N THEN PRINT "N is too large":GOTO (repeat input) will solve the problem. It might be a good idea to put your error checker in a subroutine and call it before you execute a Get stateI will be going to China for a year and would like to bring my Color Computer, CGP-115 printer, and CTR-80 with me. Is this possible? The electrical current over there is 220 volts, 50 cycles.

A.L., Eugene, OR

Before you leave the states, buy a 220 volt, 50 cycle to 110 volt, 60 cycle converter. You can purchase this unit from Gerber Electronics Co., but it will be expensive. Before buying a particular unit, make sure it can handle the power rating of your system (the computer pulls about one amp, the monitor takes about the same, and your tape recorder takes only a few hundred milliamps). Is there someone out there who's already done this and can help A.L.?



We have a complete line of color computer products

Call or write for free catalog

COD's • Visa • Mastercard accepted

DISK SYSTEM \$38900

Fully Radio Shack compatible

Comes complete with:

- Attractive cabinet and power supply
- Tandon TL-50-1 Disk Drive
- Disk control board and Rom software
- · Radio Shack disk basic manual
- Diskette
- Fully assembled and tested, just plug it in!!!
- Dealer inquiries invited

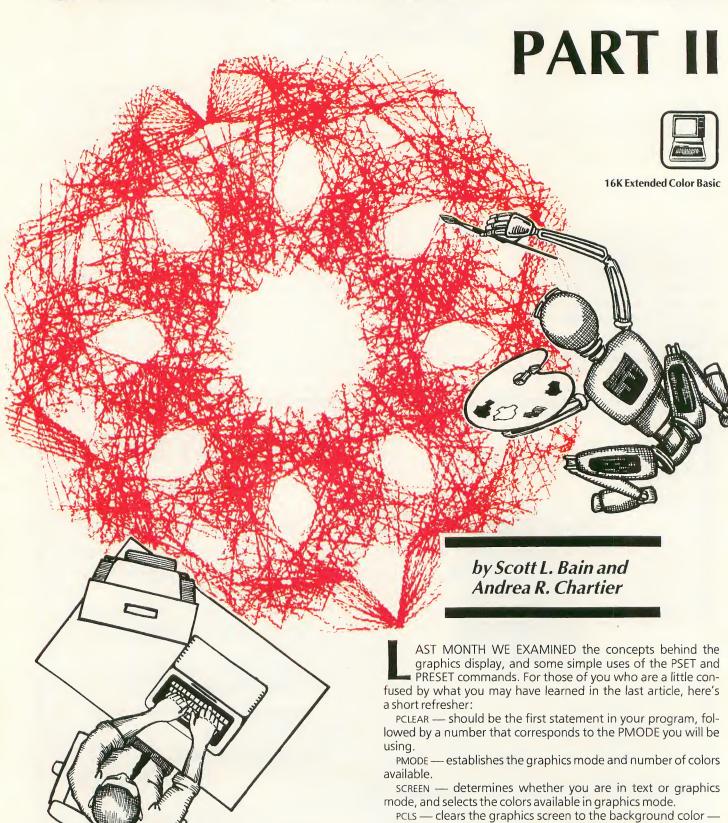
Second Drive with Cable \$279.

MICON ENTERPRISES

714/841-4210

7248 HEIL AVENUE HUNTINGTON BEACH, CA 92647





either the default color under the current SCREEN set, or any

PSET — turns a single pixel to a specified color.

available color set by COLOR.

Now we're going to teach you about some rather snazzy commands that will let you create complex graphics quickly and easily. As before, all these functions require that your machine be equipped with Extended Color Basic. Assuming this, onward.



Photo 1. Line Program

Drawing Lines

The LINE command lets you draw a straight line between any two points on the screen. The syntax is:

LINE (x,y)-(a,b), PSET.

X and y are the coordinates of one point, and a and b are the coordinates of the other. PSET, a familiar term, tells the computer to plot the line in the foreground color. Substituting PRESET here will plot the line in the background color, thereby erasing an existing line if the coordinates match.

This is fairly obvious, right? The LINE command has two other options, however, that you will find most useful — B and BF. Adding a comma and B to the end of a LINE command will cause it to draw a box using the coordinates as opposing corners, rather than a line. BF here would make this a filled box in the foreground color.

Let's try one. Type:

NEW

10 PCLEAR 4

20 PMODE 3,1

30 SCREEN 1,0

40 PCLS

50 LINE (10,10)-(100,100), PSET

70 GOTO 70

RUN

You should see a red line on a green background in medium resolution. The line's upper left corner is at point (10,10) and its lower right corner is at point (100, 100).

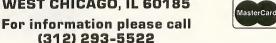
Push the Break key, then type:

35 COLOR 2,3 RUN

\$99. FOR 64 K

We take a special interest in you and your COCO (COLOR COMPUTER/TDP 100). After receiving your COCO (D, E or F boards, 1.1 ROM) we upgrade it to 64K and return it within 24 hours by UPS. There is a \$5. handling charge that covers return shipping and insurance. With your 64K upgrade we'll supply software and instruction to help you to fully understand the true potential of your new founded 64K. We are an up and coming business and need your support. We will help you with any question that may arise and hope that you may tell your friends about our services. We have other services to support your COCO such as: Mark Data keyboards installed (\$79.), lower case adapter installed (\$75.), custom Eproms, and 64K programs. All you need to do is send your computer, securely packaged, with a money order*, cashiers check*, or personal check* (allow 2 weeks for personal checks), or Visa/MasterCard (Please include expiration date) for the price of the upgrade or installed product and \$5. handling to:

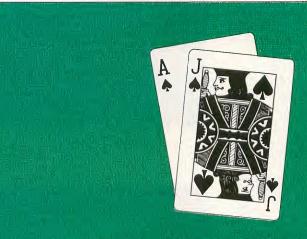
PSM ELECTRONICS 1217 KINGS CT. #12 **WEST CHICAGO, IL 60185**



*2% discount

VISA

R 0 B A K A



BLACKIACKPRO

A computer assisted learning tool to condition you to make the right play effortlessly and beat the house. Read about BLACKIACKPRO on page 97.

BLACKJACKPRO is a trademark of Skillware Corporation

L L W K I Α R Now you should have a yellow line on a blue background. Add ,B to the end of Line 50, then after looking at that, change it to ,BF—isn't this fun?

Circle

Plotting a circle or ellipse is not much more difficult than plotting a line. The basic syntax is this:

CIRCLE(x,y),w

where x and y are the coordinates of the center of the circle, and w is the width (in pixels). The command: CIRCLE(128,96),95 would plot a circle with a center of 128,96 (the center of the screen) and a width of 95.

Other options include color variation, height variation (for ellipses), and partial or arc plotting.

The complete syntax, with options, would be:

CIRCLE(x,y),w,c,h,s,e

The color of the outline of the circle is specified by c. Normally the foreground color would be used, as when c is omitted. Using the c option lets you vary this.

The height multiplier is specified by h. Normally the height is the same as the width (a perfect circle), and therefore the multiplier would be 1, which is the default value. Specifying an h of less than one, let's say .5, would cause the circle to be less tall than it is wide, generating a fat ellipse. Putting 1.5 in the h position would create just the opposite — a skinny ellipse, taller than it is wide.

The "arc segment," or a section of the circle, is plotted through s and e, which is a little tricky to use. Basically, use s to mark the start of the arc and e to mark the end, where (if you imagine the circle as a clock face), 0 is the 3 o'clock position, .25 is 6 o'clock, .50 is 9 o'clock, etc. An s of .50 and an e of .75 would plot only the left lower quarter of the circle.

If you want to use some of the options but not others, the syntax requires only that you keep the number of commas in the statement consistent with the format. For example, to vary the height, but not the color, the statement would be CIRCLE(128,96),95,...8. The extra comma tells the Color Computer that .8 is a height specifier and not a color (which is fortunate, since a color of .8 would be quite illegal). Note that the commas for s and e are not included, since they come *after* the height command and therefore would not confuse the issue.

Let's Break and try an example:



Photo 2. Circle Program

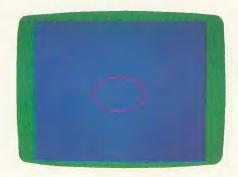


Photo 3. Alternate Circle



Photo 4. Draw String



Photo 5. Alternate Draw String

50 CIRCLE(128,96),40,1

This generates a perfectly round, complete, green circle of radius 40 using (128,96) as the center. Change the command to CIRCLE(128,96),40,4,.6 and look at the difference.

Paint

The Paint command fills any closed polygon on the screen with any available color. It can be very useful, to generate images for games, etc., and is easy to use.

PAINT(x,y),c,b

As you may have guessed, x and y are the coordinates for the point at which the painting should begin. The color of the paint to be used is shown by c, and b is the border color, or the color which the paint will not cross. Our circle of color 4 could be filled up with red paint (color 4) like this:

<BREAK>
60 PAINT(128,96),4,4
RUN

The (x,y) coordinates could be any point that falls inside the circle. Change the command to PAINT (1,1),4,4 and see what happens.

Paint can be used to fill any polygon regardless of the size or shape, but be careful. If you try to paint an object that is not finished (that is, one with a gap somewhere in its border), the paint will leak out and flood the entire screen.

Get and Put

The Get and Put commands are not plotting commands, but utilities that let you make copies of or move graphics around the screen without replotting them over and over. They're fairly advanced tools, and since you don't really need them for simple graphics, you might want to skip this section if you get confused. If you feel confident, however, try it. Used carefully, they result in greater speed and shorter programs, and take less time to code than other, more conventional means.

Let's say you've got an object on the screen — a space ship or a political candidate — and you want to create a duplicate of it elsewhere. First you GET, then you PUT.

The syntax for Get is GET(x,y)—(a,b),m,G. The x, y, a, and b are the corners of a rec-



Compare it with the rest. Then, buy the best.

If you've been thinking about spending good money on a new keyboard for your Color Computer, why not get a good keyboard for your money?

Designed from scratch, the HJL-57 Professional Keyboard is built to unlock ALL the potential performance of your Color Computer. Now, you can do real word processing and sail through lengthy listings...with maximum speed; minimum errors.

At \$79.95, the HJL-57 is reasonably priced, but you can find other CoCo keyboards for a few dollars less. So, before you buy we suggest that you compare.

Compare Design.

The ergonomically-superior HJL-57 has sculptured, low-profile keycaps; and the three-color layout is identical to the original CoCo keyboard.

Compare Construction.

The HJL-57 has a rigidized aluminum baseplate for solid, no-flex mounting. Switch contacts are rated for 100 million cycles minimum, and covered by a spill-proof membrane.

Compare Performance.

Offering more than full-travel, bounce-proof keyswitches, the HJL-57 has RFI/EMI shielding that eliminates irritating noise on displays; and four user-definable function keys (one latchable), specially-positioned to avoid inadvertent actuation.

Free Function Key Program

Your HJL-57 kit includes usage instructions and decimal codes produced by the function keys, plus a free sample program that defines the function keys as follows: F1 = Screen dump to printer. F2 = Repeat key (latching). F3 = Lower case upper case flip (if you have lower case capability). F4 = Control key; subtracts 64 from the ASCII value of any key pressed. Runs on disc or tape; extended or standard Basic.

Compare Installation.

Carefully engineered for easy installation, the HJL-57 requires no soldering, drilling or gluing. Simply plug it in and drop it right on the original CoCo

mounting posts. Kit includes a new bezel for a totally finished conversion.

Compare Warranties.

The HJL-57 is built so well, it carries a full, one-year warranty. And, it is sold with an exclusive 15-day money-back guarantee.

Compare Value.

You know that a bargain is a bargain only as long as it lasts. If you shop carefully, we think you will agree...the HJL-57 is the last keyboard your CoCo will ever need. And that's real value.

Order Today.

Only \$79.95, the HJL-57 is available for immediate shipment for either the original Color Computer (sold prior to October, 1982) or the F-version and TDP-100 (introduced in October, 1982).

Order by Phone Anytime 716-235-8358

24 hours, 7 days a week
Circle No. 76 on Reader Service Card



955 Buffalo Road • P.O. Box 24954 Rochester, New York 14624

Ordering Information: Specify model (Original or F-version). Payment by C.O.D., check, MasterCard or Visa. Credit card customers include complete card number and expiration date. Add \$2.00 for shipping. New York state residents add 7% sales tax. Dealer inquiries invited.

TRS-80C° and TDP 100° SPECIALISTS



COLORFORTH*

IS THERE LIFE AFTER BASIC? Yesl with COLORFORTH, a new, high level language for the color computer. COLORFORTH, a figFORTH compiler, has an execution time as much as 10 to 20 times faster than Basic, and can be programmed faster than Basic. COLORFORTH is highly modular for easy testing and debugging, COLORFORTH has been specially customized for the color computer and requires only 16K. It does not require Extended Basic. When you purchase COLORFORTH, you receive both cassette and RS/DISK versions, the figeDITOR and an extensive instruction manual. Both versions and 75 page manual, all for only \$ 49.95

PCFORTH

FORTH for the IBM PC*and Zenith Z-100.* All the features of COLORFORTH, but customized for the IBM and Zenith Z-100 personal computers. Requires 32K and MS/DOS or IBM/PCDOS. On 5-1/4" SSDD diskette. Complete with 75 page manual, just \$59.95

NEW!

MASTER MIXOLOGIST® The Bartenders' Guide

This disk based program for the color computer contains recipes for over 150 of your favorite bar drinksboth alcoholic and non-alcoholic. MASTER MIXOLOGIST is menu driven for ease of use. Requires 16K and one RS/DOS drive. Get this one today, it will be great for your next party \$19.95

ARMADILLO BUG[®] MACHINE LANGUAGE MONITOR

More and more programs are appearing in magazines written in Machine Language. Now with AR-MADILLO BUG, you can easily enter Machine Language programs without a lot of time consuming "pokes". ARMADILLO BUG is an excellent system for beginners to learn to write and debug their own Machine Language programs as well. This package includes: Memory examine and change; Move; Punch and Load; Fill commands: and morel Runs in 16K, and DOES NOT require Extended Basic. Complete on cassette with printed manual. Just ... \$14.95

COLOR BIORHYTHMS

This is a neat BIORHYTHMS program you can use to chart the future (or past). Includes High Resolution graphics without Extended Basic being required. Runs in 16K. On cassette, with instructions . . . \$10.95

DEALER and AUTHOR INQUIRES INVITED

Please add \$ 2.00 shipping in U.S.

Foreign orders must be in U.S. funds drawn on U.S. banks, or Mastercard and VISA

ARMADILLO INT'L SOFTWARE

P.O. BOX 7661 AUSTIN, TEXAS 78712





PHONE (512)835-1088

Switchable Expansion Is Here



A PERFECT COMPANION FOR COCO The key to versatility is the new BT-2000 COMPANION. •Load 5 cartridges and enjoy the benefits of Push-Button selection. •SAVE CoCo's connector. Reduce plugging. •Indicator lights, know at a glance which cartridge is in use. •No more Turn-Offs. Switch to the next cartridge in your COMPANION. •Push a button to RESTART without turning power ON and OFF. \$225.00

FOR THE ADVANCED USER AND EXPERIMENTER

The utmost in power and versatility is the BT-1000 Expansion Interface Unit. •Built in supply to power your peripherals or experimenter circuits. •5 Expansion slots --- Internal memory decoding. •Space for your ML utilities in EPROM or in optional 8K of RAM. \$250.00. Or with 8K of RAM, \$275.00

Write now for FREE brochure. Add \$5.00 s & h. Check, money order, VISA, MC (Account no. and expir. date). COD charge \$2.00 (req's certified check or money order). Mich. residents add 4% sales tax.

Also for CoCo:

BT-1010 Parallel Printer Interface 79.95

BT-1020 Real Time Clock/Calendar 109.00

BT-1030 Versatile Interface Port 69.95

pasic

Dept. C

P.O. Box 511 Ortonville, MI 48462

ECHNOLOGY

(313) 627-6146

♦ from page 106

tangle that should completely contain the object to be copied. The m is an array dimensioned earlier in the program, using the following formula to determine its size:

SIZE = ((abs(x-a)*ABS(y-b))-1)/n

where n is 40 for PMODEs 3 and 4, 80 for PMODEs 1 and 2, and 160 for PMODE 0. Array m must be dimensioned to at least this size, and, despite what the Radio Shack manuals say, need only be one-dimensional. (Review the material on arrays in the Radio Shack manual if you are unfamiliar with them.)

The G in the Get command tells the computer that this is to be used for graphics, and is not optional.

The marray now contains the information necessary to replicate whatever was in the rectangle you specified. To make the copy, Put it somewhere, like this: PUT (x,y)-(a,b),m,PSET. The coordinates here should indicate a *new* rectangle for the object to be copied into, m should be that same array, and PSET indicates that the new object should be in the same colors as the old object.

PSET can be replaced with any one of four options: PRESET, which works to create the object in the background color; OR, which places the object into the rectangle without erasing anything that may have already been there (merely lays it on top); AND, which only plots the pixels that are on in the m array and the destination area. This is rarely useful; and NOT, which reverses the status of every pixel in the destination rectangle, irregardless of what is in the m array, creating very strange results.

To move an object rather than duplicate it, Get the object, then blank it off the screen using LINE(x,y)—(a,b)PRESET,BF. Now Put the array next to where it used to be. Repeating this process gives the illusion of motion.

Draw

The Draw command is the simplest and most complex way to create an image on the graphics screen. It is a sister to the Play command used in sound generation, in that it uses a string or string variable to store its parameters: DRAW "string" OF DRAW A\$.

The Draw command uses a graphics "turtle," which is a cursor on the graphics screen that leaves a trail of pixels turned on as it moves. Basically, the string in the Draw command controls where the turtle moves, what color it uses to draw, etc.

The string or string variable contains a series of commands that the turtle follows, in order. For example, DRAW"U10; R10" tells the turtle to move up 10 pixels and right 10, leaving a trail behind, and assuming the foreground color since none is indicated. The commands the string may contain are listed below:

U,D,R,L — Move up, down, right, or left the number of pixels that follow the command. The default number (the number the computer will use if none is specified) is 1.

E,F,G,H — Move diagonally — E is to the right and up, F is to the right and down, G is to the left and down, and H is to the left and up. As with the above commands, 1 is the default number.

cn — Change the drawing color to n. The drawing color will remain n until it is changed again.

An — Changes the turtle's orientation. An n of 1 makes the right of the screen act as the top of the screen, so all future U commands will actually move the turtle toward the right. All direction commands are turned to compensate until a new A command is encountered. The n can be 1 for the right side, 2 for the bottom (totally inverts everything), 3 for the left side, or 0 (default) for the top.

Sn — Injects a scaling factor into all future movements. The default is 4, so S8 would double the size of all commands that follow it. If you put an S command at the beginning of the Draw string, the entire image being drawn will be scaled accordingly. The n can be any number from 1 to 62, with numbers less than four shrinking the drawing and numbers greater than four enlarging it.

N — No update; basically, this command applies to the command which follows it, causing the turtle to execute the next command, then return to where you are now. The combined command NR20 would tell the turtle to move 20 pixels to the right (leaving a trail), then return to the position it held before the move.

 Causes the turtle to move to a new position on the screen. For instance, M20,20 would move the turtle to position 20,20, leaving a trail behind. м can also be followed by relative numbers; M+2,-5 would mean move to a position that has an X coordinate that is two greater than your current one, and a Y coordinate that is five less, leaving a trail behind.

B — Blank applies to the motion command that follows it. BR5 would move the turtle five pixels to the right, without leaving a trail behind it.

x — Means execute the following substring and return. XB\$; would cause the turtle to look for the variable B\$ in memory, execute the draw commands contained there, then return to the current string and continue on.

To give you an example of the Draw function, we're going to write a program that will display the draw strings on the hi-res screen. Then, we'll give a few sample strings to draw.

NFW

10 PCLEAR4

20 PMODE 4,1

30 SCREEN 1,1

40 COLOR 5,0

50 PCLS

60 DRAW "BM128,96;U5;R5;D5;L5"

70 GOTO 70

Here are a few other draw strings you can put in Line 60:

"BM128,96RER7F1R2E1R1BM-5,+10U10L4D10" "BM128,96D14U4R3FR3ERFRFU10HLHLGL3D4HL3 U4R3"

"BM128,96F7R2EHL2BM+3,+1R3FR2EHL2BM+1, -1H4"

"BM128,96FDGHURD4R2ERFGLEL6HLGFRHR4D4

"BM128,96HE2F2G2D2R2E2F2G2H2L4H2G2F2E2 R2D2F2G2H2EHEG8"

Those are the Extended Basic commands that give you so much freedom on the Color Computer. Remember them the next time you play a high resolution game program you've paid lots for, and realize you could have done it yourself, and better.

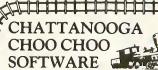
Now, a few notes follow to help you get started. Next month we'll look at a drawing board" program that will demonstrate the use of all these commands while turning your machine into a scratch pad for your creative urges.

Notes

Line does not necessarily need the first set of coordinates. LINE—(a,b),PSET makes perfect sense to the Color Computer. It means "plot a line from wherever you are now (wherever the last Line or Draw command ended) to the a,b coordinates, PSETing the pixels.

PRESET in a Line command can be used to make "holes" in closed polygons. Just plot a PRESETing line through one side of the object, and you've created a gap. Why create a gap? See the explanation of Paint if you're not sure.

The commands in a Draw string can be separated by semicolons for your own debugging ease, but the computer ignores them. You should remove them when the program is in its finished state, since they do consume memory.



Your One Stop Station Track 29 For Computer Programs

Buy 1

Buy 2

Program Get 10% OFF

Programs Get 15% OFF *Except Prickley-Pear

Datasoft, Inc. (Tape or Disk) Zaxxon (32K) \$39.95 Moon Shuttle \$29.95 Pooyan (32K) \$29.95

Inteco Software Intergalactic Force Pinball & 8 Ball \$24.95 ea. (on Rom Pac \$29.95 ea.) Adventure Int'l.

Sea Dragon (32K) \$34.95 N Fire Copter (16K)

NEW!

Prickley-Pear Software 15% Off Vikings, *Flight (32K), Jungle \$19.55 * 16.95 * ea. Omni Clone \$39.55 \$33.95

\$24.95 Computerware Doodle Bug \$24.95 Bloc Head \$26.95

Tom Mix Software *Donkey King (32K) \$26.95 ea. Trapfall, Frog \$27.95 ea.

Shark Treasure \$21.95 Mark Data Products Super Pro

Spectral Associates Lancer (32K) Storm Arrows Gallax Attaxx \$24.95 ea.

NEW! Keyboard \$69.95 *Glaxxon *El Bandito *Cosmic Clones \$24.95 ea.

*Also available on disk (32K) at extra charge.
All programs 16K on cassette
unless otherwise stated.
Send for free complete catalog and descriptions!
WE pay postage within the U.S. and Canada
TN residents add 6.25% sales tax; COD add \$2.00



(615) 875-8656 P.O. Box 15892 Chattanooga, Tn 37415

VISA



Circle No. 80 on Reader Service Card

Rt. 40E. Woodstown, N.J. 08098



What is the *ultimate* all-software music synthesizer for your TRS-80 Color Computer?

What is the *least expensive* all-software music synthesizer for your Color Computer?

The most realistic music experience you'll ever hear from

your Color Computer!

What good is a CoCo Port? (Part 1 of a series).

The Green Mountain Micro CoCoPort adds input/output POWER to your TRS-80 Color Computer. That means you don't have to buy a separate PARALLEL PRINTER INTERFACE for \$70 or more. Just use the CoCoPort. The "throughput" of parallel printers is FAST. Compare:

FORX = 1TO66:PRINT# - 2,STRING\$(64,45):NEXT

Radio Shack serial: 1 minute 48 seconds CoCoPort Parallel: Only 56 seconds

Even more important is CoCoPort's FEED-THROUGH CONNECTOR permitting its use with ROMpack cartridges and disks (Fast EDTASM+ listings!). So don't double up on printers. Add a parallel connector to your CoCoPort cable (we'll wire it for you), plus 88 bytes of software, and you can use the parallel printer you already own! We'll give you the printer software FREE with your CoCoPort. And when you don't need to print, your CoCoPort is ready to do other work for you.

(Comparisons made using a Microline 82A serial/parallel printer. CoCoPort \$49.95 (\$39.95 kit). Cable and connectors additional. Parallel connector, \$10. Assembled cable, \$20 complete. Add \$2.50 shipping and handling.)

- Lowerkit II, \$79.95 / \$49.95 kit
- 64K Color memory upgrade kit, \$49.95
- MC-10 added 4K upgrade kit, \$19.95
- CoCoPort interface, \$49.95 / \$39.95 kit
- RAM/ROM pack, \$29.95 / \$19.95 kit
- Color Burner, \$49.95 / \$39.95 kit
- BackPack battery backup, \$39.95
- 128K Bubble Memory, \$600 / \$500 kit
- Scroll-A-Roll display software, \$24.95

COLOR QUAVER

Software Music Synthesizer

(New Version 2.1 for 32K ECB)

by Dennis Bathory Kitsz author of "Custom Color"

- Real Music Synthesis More Than Bleeps!
- Full 4-Part Harmony In Precise Tuning.
- Versatile Editor/Compiler/Storage System.
- Entirely Software No Hardware Needed.
- · Variable Tone Qualities for Each Part.
- 64-Step Variable Envelope for Each Part.
- FAST Compiler Finished Music in 5 Seconds!
- Ready-to-Play Sample Tunes Included.

Special Holiday Price —Only \$19.95 on tape

(Add \$2.50 shipping and handling)

(Not sure? Audition Our Sample Music Tape — \$4.00 postpaid)

For 32/64K TRS-80 Color Computers with Extended Color Basic.



Green Mountain Micro

Bathory Road • Roxbury, Vermont 05669 (802) 485-6112

Continuing support for Color Computer Model I/III and 100

COD/VISA/MASTERCARD

Dealer Inquiries Invited.

---REVIEW\$

MicronEye

Micron Technology, Inc. 2805 E. Columbia Road Boise, ID 83706 (208)383-4050 **\$295**

F COMPUTER VISION interests you, the MicronEye will interest you. It provides a complete digital imaging system for a 16K Color Computer. I am interested in character recognition (see the Photo, taken from the fine print in the table of contents of this magazine) and have found the resolution of tiny print to be outstanding. Possible uses of character recognition systems include graphic input, security, pattern analysis, automated process control and robot vision.

The heart of the MicronEye is the OpticRAM, developed by Micron Technology (not the Japanese). This OpticRAM is composed of 65,536 individual imagesensing elements arranged in two arrays of 128 by 256 elements. The technological advance represented by this device results in a 1000 times reduction in price over previous generation sensing chips, such as the CCD chip.

Ordering the eye was simple enough. A simple telephone call and a credit card were all that was needed. Shipping is via Federal Express second day service, resulting in fast hand delivery of the well cushioned box. I was pleased to see that the shipment included everything necessary to operate the eye. Among the



MicronEye: A Digitized Image

packed items were the lens, OpticRAM and tube (bullet), tripod, interface electronics, cable, software cassette, and manual. Everything comes assembled; just read the instructions, plug the card into the ROM slot, load the software and you're in business.

The 45-page manual is well written and includes software listings and a schematic diagram. Sections on programming, advanced technique, and troubleshooting indicate that this company is selling a product and the technical information necessary to take that product to its limits.

The lens has adjustable focus and an adjustable aperture. Shutter speed is a function controlled through electronics rather than mechanics, resulting in fully software-controllable exposures. The

supplied lens and close-up ring enable focusing from five inches to infinity, but the standard C-mount permits easy lens changes, if desired.

Ordinary room light is more than sufficient to obtain good images if a proper shutter speed is used. In bright light it is possible to obtain about fifteen images per second; one per second is more appropriate inside my house. I have not obtained good images of my basement (it isn't photogenic) because it does not translate nicely into pixels, which are jet black or snow white. Shades of gray may be detected by using multiple scans at different exposure times — using these shades is an exercise left to the purchaser.

My only problem arose when I tried to connect the interface card to the ROMport. The instructions say: "When inserting the interface, always be certain that the component side of the board is down." The components are sealed in a plastic black box with nothing more than a double-sided card connector protruding. The end of this rectangular black box should rest alongside the keys; no part of the box should extend behind the computer. The card connector which goes into the ROMport is not "idiot resistant" like the Radio Shack game cartridges; I had to open the port door with my finger and watch lest I cram the card above. below, or off to the side of the socket.

MicronEye is a sophisticated piece of equipment; I would strongly recommend it for anyone working with computer vision.

— by Mike Rigsby

Astro Blast

Mark Data Products 24001 Alicia Pkwy, #226 Mission Viejo, CA 92691 **\$24.95 cassette, \$27.95 disk**

FIRST OF ALL, I never even saw the Command Ship — much less got a shaky-handed shot at it. Whether this was due to a slight bias in Astro Blast towards the nasties, my eye-hand coordination not being sound, or the unfortunate state of the Radio Shack joystick (a truly slack-action device) — I never got past the type number 3 aliens.

Astro Blast is an Invaders-inspired game. Three different series of aliens descend on your ship/launcher/station. Your blaster moves and shoots slowly, making it quite a feat to get through the

waves of aliens. You have to get through each unit or wave and wipe them all out before you can go on to another. But, not only do you have to plaster the blasters — you have to avoid comets as well.

An easy-to-read fuel and blast shield gauge keeps you well informed concerning your status. Going to higher skill levels is probably a wonderful sport. You have to be confident — and good — to be able to work your way through the various levels.

Astro Blast can accommodate more than one player; unfortunately, not simultaneously. The game lets you get hit three times before the game unceremoniously ends. The graphics used to represent alien or defender hits are adequate but not spectacular.

The instructions on the back of the package cover the game well. The only addition I would like to see is an extra set,

printed on the cassette case insert or just as a piece of paper that could be stuffed into the cassette case.

Astro Blast is good for beginners to game playing and, most likely, better for children than adults.

— by Leslie Venable

COLORKIT 1.2

Prickly Pear Software 9234 E. 30th Street Tucson, AZ 85710 \$34.95 cassette, \$39.95 disk

NE THING I MISS most (as a professional programmer) on my micro is

▶ more

THE TOP-RATED COCO WORD PROCESSOR:

Colorware researched the word processors available for the Color Computer. We came to the very same conclusion that so many review articles have! Telewriter-64 is, by far, the superior word processor for the Color Computer.

Why is Telewriter so much better than the others? For one thing, it has overcome the 32x16 character display limitation of the Color Computer. No small feat, Telewriter accomplishes this by generating its own set of characters in software. You select 51x24, 64x24 or 85x24 character displays by merely issuing a format command. If you have ever used a word processing system, you know how important it is to be able to see a good portion of your text on the screen.

bl se hours le so co or no	at the state of th	ik there consider	artier that it it is	e ise	at to the	et et	De ne le	il st	or restrict	ore entrope in the property of	to the state of th	out the	he will re-	d ns	Po te	PC PC	5-6 TE WAR AND THE TENT	id 1x 4" ote see erf	et of the series	Pr ar	nd or or or or	ra rev rev rer ra ra ra ra ra ra ra ra ra ra ra ra ra	et er er ms	er se		
		or.										_														ı
		C									0							•								
2	1	Ś	3	4	5	6	7	8	9	0	1		Ť	Ş	Z	8	•	()		=	t	à	;		
ä	b	t	đ	е	F	9	h	ĺ	1	k	ļ	н	n	0	P	9	٢	5	ŧ	U	٧	н	1	S	1	
7	•	,	,	;	1	>	2		1	-		Ş	7	8	•	()	*	:	Ε	-	ı			A	

Telewriter-64 also generates true lower case characters. This is much preferable to the reverse characters that merely "represent" lower case letters in other co-co word processors.

Telewriter-64 is feature packed. Besides the standard features found in any word processor, Telewriter also includes: user-friendly full-screen editing, rapid cursor and scrolling control, page jump, right justification, menu-driven disk or cassette access, compatability with spelling checkers (such as Spell-and-Fix), and a clever double check that asks the user "Are you sure?" before executing any operation that would kill any sizeable amount of your text.

Telewriter-64 runs on any 16K, 32K, or 64K system (extended Basic not required) and works with printer. There is even a "typewriter" mode which sends typed lines directly to your printer.

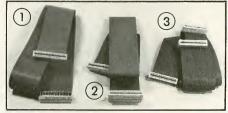
With advanced word processing software such as this, your color computer becomes a truly powerful word processing system, with a price that makes sense for the personal user.

Beyond impressive capability, Telewriter-64 simply makes any kind of writing a pleasure. It is a truly sophisticated system that is marvelously easy to learn and enjoyable to use.

TELEWRITER-64

any printer. It has all of the control codes necessary to take full advantage of all of the features in any Disk \$59.95 Cassette . \$49.95

CABLES



QUALITY DISK DRIVE CABLES

High quality cable and high force, gold plated contacts ensure the utmost in connection reliability for your CoCo or TDP-100.

1) Disk pack extender, 3 ft. . . \$29.95 Allows you to move your disk drive interface back and out of the way.

② One Drive Disk cable \$19.95

③ Two Drive Disk cable \$29.95

COCO ROM/PROJECT/PRODUCT CASE



QUANTITY 2-4 (2 min.) 5-9 10-99 100 & up PRICE EACH \$5.50 3.50 2.75 CALL

Give a Professional look to your project or product

- Designed especially for the Color Computer ROM slot.
- High quality 3 piece injection molded black plastic with spring-loaded door.
- Same size and specifications as Radio Shack ROMpak



TOLL FREE ORDERING 800-221-0916

Orders only. NY & Info call (212) 647-2864

SUPER-PRO KEYBOARD

REPLACEMENT PROFESSIONAL KEYBOARD KIT...ONLY \$69.95

- Contour molded, full travel keys for fast smooth typing.
- Custom made to fit precisely. Has same key layout.
- Complete, easy instructions for any CoCo or TDP-100.
- Ideal for word processing and other serious CoCo use. Note: For computers manufactured after Oct. 1982, add \$4.95

UPGRADE IN JUST MINUTES!

COLORWARE LIGHT PEN



ONLY \$19.95
FREE PROGRAM
CASSETTE INCLUDED

Plugs directly into your joystick port.

• Comes with six fun & useful programs on tape.

Easy instructions show how to use it with Basic.

 Comptible with light pen software such as Computer Island's "Fun-pak."

EXTENSION CABLE FOR YOUR MODEM/PRINTER Place your modem or printer where you Place your modem or printer where you

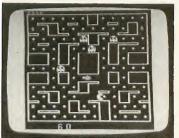
Place your modem or printer where you want. 15 ft. cable with four-pin male and four-pin female DIN connectors.

Colorware Incorporated 78-03A Jamaica Avenue Woodhaven, NY 11421 (212) 647-2864

COLORWARE

Circle No. 82 on Reader Service Card

WE PAY The shipping on any order that includes at least one game. **For the phone call. Use our convenient toll free watts line.



GHOST GOBBLER

From Spectral Associates, this "Pac" theme game is the best of it's type. Brilliant color, action and sound, just like an arcade gobble your way to glory, but watch for those ghosts! Get in on the wild fun of this game craze now. Requires 16K. Tape: \$21.95, Disk: \$25.95

IKEY KING



DONKEY KING

You simply can not buy a more impressive game for your color computer than this new wonder from Tom Mix. The graphics, sound, and animation are all just astonishing! There are four different graphic screens and each is endless fun. Requires 32K. Tape: \$24.95, Disk:

GHOST GOBBLER



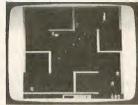
PROTECTORS

There are several good ver-sions of the "Defender" theme available for the CoCo. None, however, rival this one from Tom Mix. No other game matches the detailed graphics and sheer excitement of this top Requires 32K, Tape: \$24.95, Disk: \$27.95



INTERGALACTIC FORCE

Your space fighter roars into the Death Corridor. Lock-on and blast the enemy fighter from the sky. Now try dropping one into Death Star's narrow exhaust vent. It takes skill and guts. Good luck! With "Star Wars" theme song. From Anteco. Requires 16K. Tape: \$24.95



ANDROID ATTACK

Spectral Associates' very well done "Berserk" type game with some interesting added features. Each cassette contains both the 16K and 32K version. The 32K version has voice output! Plenty of action. Tape: \$21.95



CREATURE FEATURE

From Color Software, comes a lightening swift shoot & dodge the enemy game. It's clever cross between "Robotron" and "Beserk" themes, with bullets flying everywhere. Solid, shoot-em-up-fun. Requires 16K. Tape: \$17.95. Disk: \$19.95



FROGGER

Just released by The Cornsoft Group, this is the officially licensed version from Sega, the arcade manufacturer. It has it all! 4 lane super highway, snakes, turtles, logs, alligators, etc. Lots of action and laughs! Requires 16K. Tape: \$19.95

THE COLORCADE

SUPER JOYSTICK MODULE

ONLY



★ It's a Joystick Interface

Now you can connect any Atari compatible joystick to your CoCo. These sticks are extremely rugged and provide very fast response and real arcade type action. They will improve the play of almost any game. The difference will amaze you!

★ It's a Rapid Fire Module

Press the fire button on your joystick and get a great burst of fire instead of just a single shot! Adds tremendously to the many shooting type games that do not have repeat fire. With variable burst speed.

★ It's a 6 ft. Extender Cord

THEATARI



A well proven joystick, the Atari is known for being rugged and reliable. It gives good response and is the stan-dard among home video players. Now at a great price! Use with module above.

ZIRCON VIDEO COMMAND



This one has received outstanding reviews. Its unique design fits the hand beautifully and it has the truly fast and positive response needed for high speed play. Actually out-performs some joysticks that cost \$50 or more.

WICO FAMOUS *"RED BALL"*



The high performance joystick from the people who make them for the arcade machines. Built to take the abuse of even the most enthusiastic player. This is the best! Wico #15-9730. Use with module above.

-TOLL FREE-800-221-0916 -ORDER LINE-

ORDERING INFORMATION

ADD \$2.00 PER ORDER FOR SHIPPING. WE ACCEPT VISA, MASTERCARD, CHECKS, M.O. C.O.D. ADD \$3.00 EXTRA. NY RESIDENTS ADD SALES TAX. OVERSEAS, FPO, APO, ADD 10%. DEALER DISCOUNTS AVAILABLE. IF ONE OR MORE GAMES ARE INCLUDED, SHIPPING IS FREE.

COLORWARE

Colorware Incorporated 78-03A Jamaica Avenue Woodhaven, NY 11421 (212)647-2864





the powerful set of utilities available on most mainframes. Micro owners must acquire utilities one by one until they collect a good set of them. The problem then is to load all those separate programs so they can be used at will. Arizin has taken a step in the right direction with a superb package of utilities called "COLORKIT."

"COLORKIT" is a 5.2K fully relocatable machine language program (there is also a smaller, 1.5K version available). The program uses the Basic ROM hooks and can be turned on and off as desired. Since the program can be loaded anywhere in memory, it can be used concurrently with a variety of machine language or Basic programs.

The utilities available are divided into five categories: Basic program tools; keyboard tools; run time tools; memory tools; and toolkit control commands.

Each category includes several utilities, some of which are very powerful. I have been using "COLORKIT" about six months, and I still haven't been able to use all the tools in actual application, although I have tested them all. The tools included significantly enhance the Color Computer's power, and all commands are easily entered by typing a period followed by the command.

Basic Program Tools

Basic program tools include a number of utilities designed to make Basic programming easier:

.DATA translates a resident machine language program into Basic data statements and appends them to a resident Basic program. This lets the user append machine language programs with data statements and POKEs without having to key in the actual machine language.

.DELR deletes all remarks from a Basic program, cutting down the amount of memory required. The .DELS command deletes spaces in the same program. Both commands can appreciably reduce the size of a Basic program.

.GBL is one of the handiest commands. It lets you search globally for any string. You can even tokenize a Basic statement and search the program for it. The search can easily be continued to look for multiple occurrences of the same string or Basic token.

.MMRG merges the resident Basic program with a resident machine language program. The merged machine code cannot be listed (it is invisible), but can be saved and loaded as any ordinary Basic program. The code can be purged

from the Basic program with the **.MPRG** command.

.OLD is a great command for those who type NEW and later regret it. This command lets you recover the old program as long as you haven't entered the new one.

To protect a Basic program currently in memory, the **.PROT** command is issued. This will protect that program and let you load another Basic program. The old program becomes transparent while the new one is used, worked on, or saved. The New command will not affect the old program, but will get rid of the most recent one. The old program, still invisible in memory, can then be accessed via the .REST command. A manipulation of the .PROT and .REST commands will let a tape user merge two programs and save them as one, a feature currently only available with the Merge Disk Basic command.

One of the handiest tools is the .VAR command, which will create a list of all variables used in the program. I have found this feature invaluable at documentation time.

A number of Basic tools are designed to enhance the print and display features of the Color Computer. These tools are especially handy if you have a printer:

.DARK reverses the video on the screen and creates light letters on a dark background. The command **.LITE** will return the screen to its normal display.

For more readable printed output, the .DFLF command will send an extra line-feed character to the printer. This causes all output to be double spaced. I have used this often with working copies of program listings. The .SNLF command returns the print to normal single space.

Ever wished you could get a print-out of a text screen? The **.ECON** command causes all screen output to be echoed to the printer. The **.ECOF** command turns this feature off.

If you are tired of watching List commands whip the listings by you too quickly to read, the .PDLY command is for you! This utility will let you vary the listing speed. The delay can be overridden dynamically by holding the space bar down. You can also use a "single step mode" which will only print while a key is held down. For debugging (especially if you don't have a printer), this feature is particularly useful.

Keyboard Tools

The keyboard tools set enhances your

keyboard entry by making features available which are usually found only on much more expensive computers.

The .FN command lets you use the number keys (0 - 9) as programmed function keys. Each function key can be programmed (the programming is quite simple) to store and print any sequence of up to 256 screen characters. I have found this tool to be particularly useful when entering Basic programs where I have a lot of repetitive phrases. An outstanding feature of this tool is the fact that you can save the key values and create your own defaults, which are ready each time you use the "COLOR-KIT." For example, I get tired of keying PRINT # -2, so I have programmed a key to do that. In a long program, that one function alone saves me hundreds of keystrokes.

If you're a touch typist, you might like the **.KLON** command. It creates an audible keyclick (user definable) to let you know when you have entered a character **.KLOF** turns the click off.

A useful tool for Basic programming is the **.SCON** command, which gives you a full screen edit feature. This editor will let you merge program lines, or renumber copy, or move program lines, simply by entering a new line number. This feature is excellent for setting up menu screens or editing a screen of output and making a data statement out of it. The possibilities are unlimited.

Run Time Tools

The run time tools used during program execution include the ability to disable the Break key, vary the execution speed of a Basic program, and modify the trace (TRON) function. These tools are particularly helpful for Basic debugging sessions.

Memory Tools

These tools make modification or examination of memory possible. One of the most useful is the .DUMP command. It will print any portion of memory to screen or printer (or both, if the .ECON command has been invoked) in ASCII or hex. If you want to do more than just look at memory, the .MEM command will allow examination and modification of memory.

Other memory tools let you modify machine language execution addresses and move blocks of memory. This latter

more

THE PROGRAM JORE



PIRATE TREASURE

Remember the clues! You'll use word commands to trave throughout a cave in search of the sea rover's loot. With over 40 rooms in the cave, just finding your way is a challenge! Suitable for beginning and intermediate level adventure players, the game is typically three hours or more. Every new turn is a chilling adventure!

#33095 TRS80 Color Tape \$18.95



ESCAPE

Maze-like halls come to life in this fantastic 3-D graphic arcade-adventure with sound! You're trapped on top of the skyscraper. To operate the elevator, provide the correct code or else the ride down is a real killer. Search the halls, collect the clues, decipher the code-then ESCAPE!

#25232 TRS80 Color Tape \$18.95

MATH



from Spectral Associates

Why use dreary flashcards? Try these lively addition, sub traction, multiplication and division activities up to ten digits. User selects the problems in a set and difficulty fo challenge without frustration. Learn new facts then practice for perfection with the speed drills!

#ED-309 TRS80 Color Tape \$14.95



EARLY

by John Paulson from Early Games Co.

Nine, colorful, non-aggressive, interactive games develop basic skills and creativity as they entertain young children 21/2 to 6 years old. Includes numbers, letters, shapes and names plus a drawing option. No adult assistance needed

#34300 TRS80 Color 16K Tape \$29.95

YOUR COMPUTER JUST GOT A WHOLE LOT SMARTER!

THE SUPER "COLOR" TERMINAL

Version 3.0 by Dan Nelson from Nelson Software Systems

Time share, smart terminal, high-speed data transfer and Videotex! Turns your Color Computer into a super smart terminal with all the features of videotex plus much more Communicate with Dow Jones, Compuserve, and computers like TRS80 Model I, II, III, Apple, etc. via modem or RS232 direct. Save the data to tape, or print it! Cuts on-line costs to a minimum. VIP Series - new binder!

#26963 TRS80 Color Rom was \$59.95 #26952 TRS80 Color Disk was \$69.95 NOW \$59.95

THE SUPER **COLOR" WRITER II**

Version 3.0 by Tim Nelson

from Nelson Software Systems

The intelligent word processor! Includes all the features you desire from a professional quality word processor yet is easy enough for a novice to master. Utilize the 16-48K "memory sense," maximum work space, true automatic justification and compatibility with ANY printer. No others compare! VIP Series-new binder!

#26985 TRS80 Color Rom was \$89.95 #26974 TRS80 Color Disk was \$99.95 NOW \$69.95 each

TIMS

Tape Information Management System by R. A. White & D. D. Dollberg from Sugar Software

Let your COCO help get your facts straight! Arrange information—lists, records, rosters, files—anything that needs constant organization! Use the variable record/field lengths (230 characters per record and up to 8 fields) and phrase editor to record data. Then sort up to three fields delete, search by range or item and print. Requires Extended Basic. TIMS will save you time

#12205 TRS 80 Color 16K Tape \$24.95

TRS-80 EXTENDED COLOR BASIC

by Richard Haskell from Prentice-Hall, Inc.

If you want to perfect programming techniques this comprehensive guidebook is what you need. It offers the beginning and advanced programmer a hands-on approach Video screen illustrations enhance chapters on keyboard usage, BASIC programming, low and high-resolution color graphics and tape data-file handling. Learn concepts of structure used by professionals. Enjoy the easy, readable style plus an excellent set of appendices for reference!

#41038 Softcover Book \$12.95



by Thomas Czarnecki from Spectral Associates Defend your planetary outposts from an onslaught of enemy laser beams, Flippers and Buzz bombs. Develop a strategy for firing to conserve your ammo. Thrill to the crackling noise of explosions. The first screens are easy enough for beginners but the difficulty rapidly increases.

#33950 TRS80 Color Tape \$24.95



OUT-

by J. Weaver from Computer Shack

Is nothing sacred? Thieves are making off with your toilet paper, stringing it out the door and across the field. As the outhouse attendant, you must hover in your protector ship above and pick off the scoundrels. Don't fire into the fragile toilet paper! Wacky fun as you keep the facilities safe from

#22149 TRS80 Color 32K Tape \$27.95



PROTECTOR I by Mike Potter from Synapse

You must transport all your people from the city under attack by Fraxullan Slimehordes. You must lift them one by one first to the City of Hope on the far side of the volcano; then to safety at the Verdann Fortress. Beware of the Xytonic Pulse Trackers, meteoroid showers and the Laser Caves of Fear. But hurry, before the volcano erupts! Six levels of joystick controlled fast action

#28022 TRS80 Color 32K Tape \$34.95

THE PROGRAM STORE NOW OPEN IN DENVER



Over 2500 Programs for TRS-80, ATARI 400/800, APPLE, IBM, VIC 20 & C64

This is only a sampling of our sensational software!

CALL 800-424-2738 FOR OUR NEWEST PRODUCTS

UNDECIDED? NEED TO BUY A GIFT? The Program Store gift certificate may be purchased in any amount over \$10.00. Give the perfect gift!

VISIT OUR STORES

Southwest Plaza, 8501 West Bowles Ave., Littleton, CO Tenley Mall, 4200 Wisconsin Ave., NW, Washington, DC Harvard Square, 13 Dunster St. Cambridge, MA W. Bell Plaza, 6600 Security Blvd, Baltimore, MD White Flint Mall, Rockville Pike, Rockville, MD Cherry Hill Mall, Rt 38 & Haddonfield Rd, Cherry Hill, NJ Monmouth Mall, Rt 35 & Wyckoff Rd, Eatontown, NJ

Willowbrook Mall, 1400 Willowbrook, Wayne, NJ Nanuet Mall, Rt 59 & Middletown Rd, Nanuet, NY Olentangy Plaza, 829 Bethel Rd, Columbus, OH Westmoreland Mall, Rt. 30 East, Greensburg, PA Montgomery Mall, 230 Montgomery Mall, North Wales, PA Plymouth Meeting Matl, 500 Germantown Pike, Plymouth Meeting, PA TULSA Century III Mall, SR 51 & SR 885, West Mifflin Borough, PA Seven Corners Center, Falls Church, VA

COMING SOON TO:

CHICAGO OKLAHOMA CITY ST. PETERSBURG

FRANCHISE OPENINGS IN SELECTED CITIES

For Information Call (703) 556-9778 To Order Call Toll Free 800-424-2738

Mailorders: List computer, item, item #, qty, tape/disk, rom, book, price, shipping, tax & total Send check or M.O. for total purchase plus \$2.00 shipping and handling, VA add 4% sales tax Charge cards - include all embossed information. List name, address, city, state, zip & phone





SEND 25¢ FOR OUR COMPLETE COLOR COMPUTER CATALOG

THE PROGRAM STORE Dept. 07-11-3 Box 9582 4200 Wisconsin Avenue, NW Washington, D.C. 20016

---REVIEW\$

feature is handy for moving relocatable machine language programs without reloading them.

Toolkit Controls

The toolkit is turned on with an **EXEC** command and turned off with a **.BYE** command. It can be toggled on and off at will. There are many tool commands to remember and master, so a **.HELP** command is furnished which will present you with a screen of command summaries.

In general, I found the "COLORKIT" to perform as advertised. The screen editor was a bit difficult to use at first, but that may have been due to the fact that I am used to powerful mainframe full screen editors. Once I got the hang of it, I found it easy to use and a powerful tool.

The "COLORKIT" provides an abundance of excellent utilities for a low price. I have purchased other utilities that only perform one or two of the features of the toolkit and have paid almost as much as I did for the entire "COLORKIT." the utilities are all user-friendly, although some are inherently easier to master than others.

Documentation is excellent. A comprehensive 19-page manual is provided which includes a one-page summary of commands. The summary is very handy to have by your side as a reference as you learn to use the tools.

Color Computer users looking to improve their programming productivity, or just wanting to enhance their Color Computer with a full-fledged set of utilities, will find the "COLORKIT" to be an outstanding value. It will give your computer a more powerful programming environment that micros costing (literally) four times as much do not have. After using the kit for the past six months, it is hard to believe I ever got along without it.

— by Norman Garrett

Top Down BASIC For The Color Computer

by Ken Skier BYTE Books Peterborough, NH 03458 **\$14.95**

OP DOWN BASIC has nothing to do with Volkswagen convertibles; top-down programming is an approach to writing well-structured, readable, and user-friendly programs in Basic.

In a chatty style, similar to that of the Radio Shack Color Computer manuals, Skier presents eleven programs in Extended Color Basic to illustrate the top-down concepts. He goes slowly, with lots of examples and explanations for illustration. Bear in mind, though, that this book is not intended to teach you how to use Basic: it is a book about program design.

The first aspect of top-down design is structure. Most beginners write *linear* programs — we start at the cover and go from there as inspiration or desperation dictates. This is not good programming. Since any project (be it a house or a book review or a computer program) is constructed for a particular purpose, it must begin with a plan, a plan that clarifies its purpose and provides a broad outline of its parts. A good program is structured to allow extension and revision without creating new problems.

How readable a listing is comes from a kind of "internal documentation" using Remark statements, meaningful variable names, modular line numbering, and indentations. Remark statements are used as program titles, headings for blocks of code, comments and blank lines to separate code blocks. Modular numbering means starting each block of code with a multiple of 100 or 1000 to create easy-to-find subroutines, and using regular number intervals of five or ten within blocks. Indentation is achieved by starting a line with a colon. Everything in a loop between a For and its Next is indented; nested loops get stepped indentations. This really is helpful, because you don't have to hunt to find the end of a loop.

The third aspect of top-down programming, friendliness, will probably be familiar. A "friendly" program is easy to use, even if you have never seen a computer before. It is achieved in a variety of ways, including a title screen that explains the purpose of the program; frequent menus; clear directions for input procedures ("Type the number of your choice and press Enter") and meaningful output statements; error trapping with explanations ("That number is too big. Type a number between 1 and 10") and chances to confirm user intention ("Are you sure?") to avoid accidentally overwriting or clearing files.

Another facet of top-down is that it is memory hungry. You may want to save the top-down version for reference, then strip the Remarks statements and spaces for a working copy. However, 16K will be plenty of room for the demonstration programs.

By the time you finish this book, you will have typed in several good programs, including a lovely grandfather clock with high-res graphics and reasonable accuracy. You will have become a better programmer, able to flowchart and construct programs that are elegant and readable, easy to understand and modify. You will attain popularity, success, and programming Nirvana.

For the Color Computer owner who has mastered the basics of Basic and wants to sharpen his programming skills, this book is a good buy. — by T. Gray

Kaleidophone

New Salem Research West Main Street New Salem, MA 01355 \$34.95

N RECENT YEARS it has become quite common to combine visual effects with music. Now the Kaleidophone lets your Color Computer and your stereo blend into an audio-visual delight.

The Kaleidophone KP-4 consists of a small black box with two cables. One cable connects to the joystick jack of your Color Computer. The other cable has a stereo phone plug and plugs into the headphone jack of your stereo. The KP-83 User Program is a skillful blend of Basic and machine language, which lets the speed and power of machine language be used for graphics, while Basic's flexibility and simplicity handles control of the program.

The hardware part of Kaleidophone simply samples the left and right stereo input and converts the volume levels into joystick input for the computer. The left channel is fed to JOYSTK(0), and the right channel to JOYSTK(1). The KP-83 User Program is a demonstration program to show what can be done. With 22 choices included in the menu, however, you can easily spend several hours experimenting with the demonstration program alone. Some choices include: 'Loom," which is like a Navajo rug whose pattern expands and contracts with the music; "Snake," which weaves left and right depending on which stereo channel is louder; "Kaleidoscope," which is a kaleidoscope pattern flashing to the music; "Fly," which is sort of like flying through a tunnel; and "Shift and Vibrate" - you'll have to see this one for yourself!

more

COLOT GUEST For The TRS-80 Color and TDP System 100

For Orders 1-800-328-2737

Fast Machine Code • Hi-res Color Graphics • Exciting Arcade Action and Sound Fast Machine Code • Hi-res Color Graphics • Exciting Arcade Action and Sound

Fembots' Revenge"

3-D GRAPHIC ADVENTURE

The color and excitement of ARCADE ACTION combined with the sophistication, intellectual challenge and skill of an ADVENTURE GAME doesn't fully describe this cosmic Make love not war? Not with these sultry FEMBOTS! What a tale you'll tell IF you live to tell it! Cold steel never felt so HOT!

32K Disk \$34.95



The ONLY Ms. game around. A must for your PAC-like game by Tom Czarnecki

16K Tape \$19.95 16K Disk \$24.95

BEYOND THE CIMEEON MOON"



3-D GRAPHIC ADVENTURE

A dead star ... A derlict vessel ... or is it? Trapped within you must venture the corridors; defend yourself against the merciless gauntlet of agents of the machine mind. A real-time, high-res, 3-D science fiction

32K Disk \$29.95 adventure game of mind-blowing magnitude 16K Tape S24.95



3-D GRAPHIC ADVENTURE

Clash steel with thy foe in the arena of gore. Proved worthy, go in quest of the elusive Eye of Dazmor. If ye findest the orb, hast ye the might to ward off skem and the fortitude to restore the Eye? The ultimate high-res. 3-D quest for even the most experienced adventurer!

16K Tape \$24.95

32K Disk \$29.95

and "STARGATE" to offer the terrain and long-range viewer simulation possible. Warp speed action, multi-colored Goes beyond "DEFENDER" most realistic ARCADE make this game tops

16K Tape \$19.95 32K Disk \$24.95

five action packed games with great graphics & sound, SLOT MACHINE -BLACKJACK - UP AND DOWN THE RIVER - CRAPS & KENO. Why fly to VEGAS when you can have a casino at home! The VEGAS GAMEPAK is

16K Tape S19.95 16K Disk S24.95

NIBBLER

by Tom Czarnecki

Fast paced maze chase game will 16K Tape \$19.95 enteriain the entire family.

ColorQuest

9072 Lyndale Ave. So., Minneapolis, MN 55420 A Division of Softlaw Corp.

AUTHORS' SUBMISSIONS ARE ENCOURAGED Available at Dealers everywhere.

If you Dealer is out of stock ORDER DIRECT!

Shades of smartbombs and hurtling comets! Defending your planet from invasion was never so challenging Disruptor fire is your main defense against the fierce alien

16K Tape S19.95

ORDERING

32K Disk S24.95

Customer service and product support call (612) 881-2777 MAIL ORDERS: \$2.00 U.S. Shipping (\$4.00 CANADA Software Systems. Personal checks allow 3 weeks. Make checks or money orders payable to Nelson \$10 OVERSEAS) Add \$2.00 for C.O.D

ORDERS SHIPPED SAME DAY!

Circle No. 84 on Reader Service Card

This is only one aspect of the User Program. The other sections in the menu deal with user control. The manual explains how Basic programs can be added to the User Program, and how to use the built-in machine language functions. Graphic modes, color sets, sampling rates, display page origins, and other options are easily controlled within the User Program. Some machine language functions included are: shift screen outward to right and left from center; expand screen outward radially; increment graphic character codes; make screen symmetric; frame screen; contract inward; and others. These functions may be combined in any order, providing a limitless combination of effects.

It becomes apparent that the User Program is just a place to start, and the door to imagination is left open to the user.

The documentation provided is easy to follow, and additional programs and updates, on using and extending the system, are available annually from New Salem Research. Kaleidophone requires at least 16K, with either standard or Extended Color Basic.

If your Color Computer and your stereo haven't been formally introduced, the Kaleidophone will ensure that a visually harmonious relationship will result.

— M.K. Marston

The BASIC Book

by Harry L. Helms McGraw-Hill Toronto/Peterborough, NH (603)924-9281 **\$8**

S AY YOU'VE FOUND a great-looking program listing in a magazine, but it's not written for your system. Reach for *The BASIC Book*, by Harry Helms. It compares the versions of Basic for Apple II, Atari 400/800, Commodore PET, IBM Advanced, Radio Shack Level II, Radio Shack Color Computer Extended, and TI 99/4. The book avoids DOS commands, and assumes its reader has a working knowledge of at least one Basic dialect.

In 12 brief chapters and only 50 pages, Helms is forced to summarize savagely. He begins by warning the reader that programs with high-resolution graphics and statements such as PEEK, POKE, CALL, POP, USR, and the like "will be difficult, if not impossible, to convert." After giving a few tips on how to go about a conversion (list all variables; make a flowchart; work by functional blocks rather than line-by-line), Helms examines different groups of Basic commands and keywords. These are found in a "Keyword Ready Reference Chart" at the front of the book which tells you which machine uses what words.

The book has some basic flaws. It does not appear to be well-researched, as Helms appears to have based his information on the reference cards provided by the manufacturers. For example, he claims that Radio Shack Extended Color Basic does not use the RND function. The Radio Shack Quick Reference Card omits this function (among other errors). Readers are advised to carefully check the material related to the Color Computer.

The BASIC Book also lacks one feature the reader would find most useful: a comparison table to translate from one dialect to another. To see if the joystick fire button is pressed, for example, you need to know that PTRIG = 0 (Atari) is the same as STRIG = 0 (IBM Advanced) and PEEK(65280) = 128 (Radio Shack Extended Color). This kind of information is present in the book, but you have to dig it out and organize it for yourself. (Perhaps this is why the last dozen pages of the book are headed "Notes"!)

This book will not answer your every prayer in converting the heathen program, but for the price, it's not a complete sinner.

— by T. Gray

Sketch Pad

Spectrum Projects 93-15 86th Drive Woodhaven, NY 11421 (212)441-2807 \$79.95 cassette

PICTURE IS SAID to be worth a thousand bytes (I was told so by a wise old computerist). Unfortunately, computer pictures require time and patience, and many people find the process a bit too tedious. Young computerists particularly are often frustrated by this time factor. Color Computer owners have joysticks which may be used to draw pictures, but it takes a far steadier hand than mine to draw with a joystick.

Spectrum Projects has come up with an ingenious way of solving this prob-

lem. The Spectrum Sketch Pad is a 13 inch by 8 inch inclined drawing pad constructed of particle board. At the bottom center of the pad is a red spring-loaded push button. Just above the button is a 4 inch by 5 inch square covered by a plastic sheet. The plastic sheet is attached at the top, allowing the plastic to be lifted at the bottom. Just above the square is a 2 inch hole with a joystick mounted below the surface of the pad.

The joystick is controlled by a series of flat metal bars lying parallel to the pad. The bars are connected so that by moving the longest bar, the end of which covers the area of the square, the joystick control is moved proportionately. (This is very similar to a device used by artists and draftsmen to enlarge or reduce a drawing simply by tracing the original.) The longest bar has a small square of plastic with a small hole in it attached to the end, forming the drawing stylus. A pen or pencil may be inserted here and used to trace with.

The Sketch Pad plugs into the joystick jack with an attached cord. The red push button replaces the fire button on a joystick. Also included with the pad is a cassette containing the software program used with the pad. Three modes of drawing are provided in the program: Sketch, Chalk, and Crayon. These are the different graphics modes and options available in the program. The program even provides ways to make circles and select colors. The red push button is used to lift the "computer pen" so the stylus may be moved without drawing.

Six sketches are provided with the pad to help you get started. These sketches fit inside the square and the plastic is placed on top to keep them from moving while you trace.

My best efforts could not reproduce the sketch exactly, but even my worst effort was far better than I can do with a standard joystick. With the highest graphics resolution, the potential for a better defined picture exists, but since a joystick has only 64 horizontal or vertical positions, each position change results in several pixels drawn on the screen. Software could be written to divide the high resolution screen into several areas of 64 by 64 pixels, drawing one area at a time, each with full resolution.

The Sketch Pad will provide a way for young programmers to draw, and for older programmers to draw better and easier. If the thought of drawing pictures on your computer has always seemed a bit "sketchy," this product will help you say it with a picture. —by M.K. Marston

Cosmic Clones

by Rob Shaw Mark Data products 24001 Alicia Parkway #207 Mission Viejo, CA 92691 **\$24.95 cassette, \$27.95 disk**



ERE YOU ARE, defending your starbase against another set of invaders. All you have to do is knock the Clonial forces out of the sky before your missile launchers are destroyed, fuel cells used up, or the Clonial Death Layer slowly descends and mushes your base. That's all — oh, plus you have to avoid the Death Particles being emitted from the Death Layer.

Actually, as if this wasn't enough, sinister things happen that make the game rougher. If a Clonial Warrior makes it past your fire, he bounces off your base, and, if he makes it through the Death Layer, returns as a Superklone. Shoot the Superklone, and it turns into two Warriors. Shoot a Warrior and it turns into a — somewhat — harmless bomb. Harmless, that is, as long as it doesn't land on you.

I used a joystick and the keyboard and found them both awkward and very tricky to handle.

Cosmic Clones gives you a free gas-up at 10,000 points (scoring is 200 for Superklones, 100 for Warriors, and 50 for Bombs). It also deals double Warriors if you succeed in knocking out the first five Warriors in quick succession. This is a bit of a surprise and the instructions on the back of the package don't mention this. I didn't get past the death dealing double, so there may be more undocumented activities in store.

Another minor item not mentioned in the instructions is that your shots will not go through the Death Layer. As the Layer descends this becomes a severe problem.

The game is good fun, enjoyable for adults and children. All in all, it's a nice way to fight the ever-present menace of invaders.

— by Leslie Venable













There are, after all, better ways to spend a day.

I can think of half a dozen things I'd rather do than type all day. Please send me the tapes for the months I've listed below.

☐ MC ☐ VISA
Account #

Exp.

ISSUE* QTY.	PRICE	S & H EA.	TOTAL
\$9.95	\$1.50		
\$9.95	\$1.50		
\$9.95	\$1.50		
\$9.95	\$1.50		
\$1.50			
\$9.95	\$1.50		
\$1.50			
\$1.50			

Or send check or money order Name _____

MAIL TO:

Zip

The Color Computer Magazine Tapes

Highland Mill, Camden, ME 04843

*March & April are combined. CC Space Trek and Banner Program not included.

--NEW:PRODUCT\$

Kaleidophone

New Salem Research West Main Street New Salem, MA 01355

Kaleidophone lets you interface your Color Computer to any hi-fi and watch the music on TV. Interface is accomplished by connecting the headphone jack on the hi-fi to the joystick port on your computer. The 'instant program" feature allows letters to be typed on the keyboard to create new display programs. You may also program it in 16K Basic or machine language. Ten pages of detailed instructions are included. The hardware, fully assembled, and the software to run Kaleidophone are included. Display modes that are unavailable in Extended Basic can also be used. Kaleidophone costs \$49.95.

Besides the hardware (which includes all necessary plugs and cables) you receive a free issue of *Kaleidophonics*, a cassette "magazine" of programs for the Kaleidophone. The current issue consists of more than a dozen display programs in Basic plus nine machine language routines for high speed effects.

Circle No. 95 on Reader Service Card

O-Pak

Frank Hogg Laboratory Inc. 770 James Street Syracuse, NY 13203 (315)474-7856 \$34.95

FHL has taken its Hi-Resolution screen package from FHL Flex and added a number of useful utilities to it. This new package, called "O-Pak," is for the Radio Shack OS-9 operating system. O-Pak's Hi-Res screen has the same control codes and features found on FHL Flex, including screen formats of 64 x 32, 64 x 24, 51 x 24 and 32 x 16. O-Pak includes utilities that allow copying

files between the FHL Flex system, Radio Shack's OS-9, and standard RS DOS disk formats. Other commands allow cataloging disks and listing files of different disk formats. O-Pak will be sold for \$34.95.

Circle No. 96 on Reader Service Card

Time Patrol

Computerware Box 668 Encinitas, CA 92024 (619)436-3512

Travel through time zones, fend off attacking blimps, helicopters, spacecraft of all kinds, and more. Become intimate with the full capabilities of your joystick with 360 degrees of firing range. Hi-res Time Patrol requires 32K and costs \$26.95 on cassette and \$29.95 on disk.

Circle No. 97 on Reader Service Card

Daisy Wheel Printer

Radio Shack 1800 One Tandy Center Fort Worth, TX 76102 (817)390-3885

The new DWP-210 Daisy Wheel Printer is available for \$799. It prints business and personal correspondence and reports at over 200 words per minute at 10 characters per inch. The DWP-210 features switch selectable 10 or 12 characters per inch pitch, or proportional spacing. The interchangeable drop-in 100character daisy wheel (available separately) provides a wide variety of fonts to give letters and reports added impact. The DWP-210 prints originals along with two copies and features 1/120inch minimum space and 1/ 48-inch line feed. It is code compatible with all TRS-80 Scripsit word processing software packages. It features a TRS-80 Color Computer compatible serial interface as well as a standard parallel interface, is U.L. listed, and includes a carbon ribbon and

a Courier 10 print wheel. Radio Shack also has a new DWP-210 Bi-Directional Tractor Feed Kit for \$149.95 that allows the DWP-210 printer to accommodate fanfold paper as well as letter or legal size single sheet paper. Adjustable left and right tractors accept paper up to 13" wide. Upper and lower paper guide bars on the tractor kit keep paper separated as it enters and leaves the printer. The DWP-210 Bi-Directional Tractor Kit can be quickly installed or removed.

Circle No. 98 on Reader Service Card

Pie Charts

Southern Software Systems 485 South Tropical Trail, Suite 109 Merritt Island, FL 32952 (305)452-2217

The Pie Zapper creates "pie" or sector charts on the Color Computer's highest resolution screen to bring you sharp charts. The Zapper can produce up to 18 sectors on a chart, with each sector labeled. Optional numerical values can be printed on the screen as actuals or percents. with or without totals. It also has up to six sector styles with large titles for each chart. Tapes or disks will store completed charts, and the system is menu driven. A data editor allows for entering, inserting, Listing and saving

data sectors. The Zapper uses its own set of characters to put numbers and labels on the screen. Printouts are possible with readily available screen print programs for almost any printer. The Zapper costs \$15.95 for the 16K tape version and \$19.95 for the 32K disk version. Extended Color Basic is required. The Zapper comes with a 14 day money back guarantee.

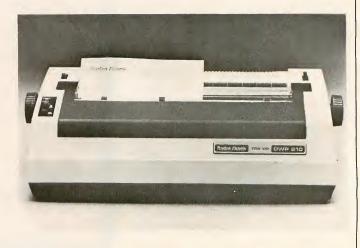
Circle No. 99 on Reader Service Card

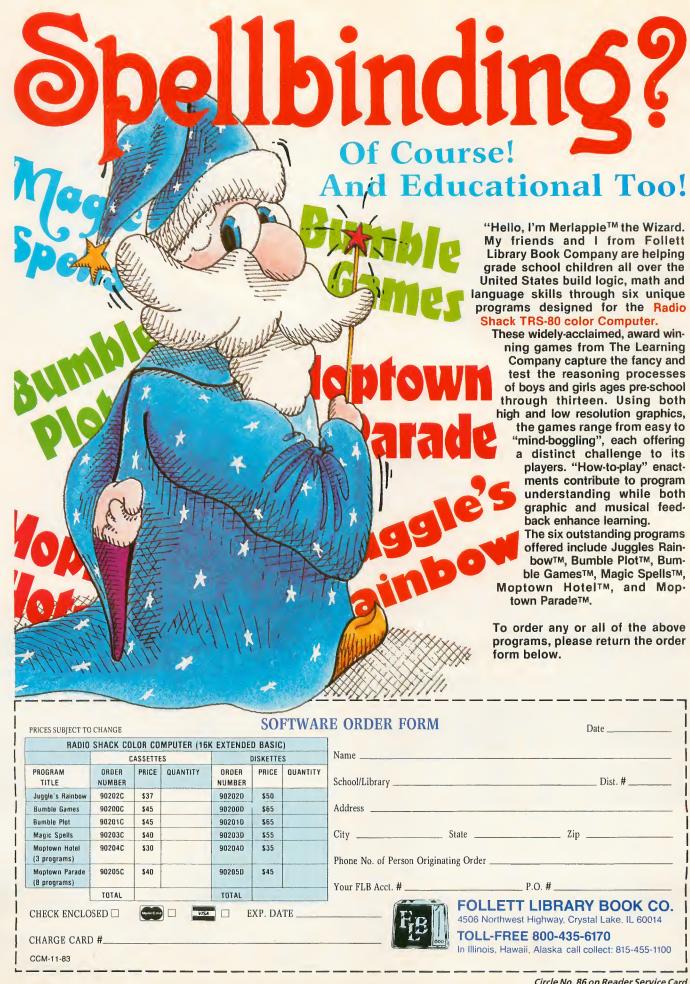
Infidel

Infocom Inc. 55 Wheeler St. Cambridge, MA 02138 (617)492-1031

Set in the Egyptian desert near the banks of the Nile River, Infidel challenges you to find the buried entrance to the last great pyramid and, once inside, seize priceless treasures that have remained hidden for thousands of years. But you and your party are ill-equipped. Tempers flare. Relations deteriorate. When you force your men to dig on a Holy Day, they've had enough. You're drugged and left for dead — a worthless infidel. The first challenge is how to find the right spot and enter the pyramid, Inside, you'll encounter rooms and chambers filled with death traps. Only after you unravel the mysteries of this pyramid

♦ more







AMDISK YOUR COLOR COMPUTER®

Get 312 Kbytes* of on-line, formatted storage capacity for your Color Computer with the Amdisk-III. The Amdisk-III is a disk drive system that combines the capacity and compatibility of 5¼" floppies with the convenient size and ruggedness of the state-of-the-art in technology — the 3" microfloppy cartridge.

Join the move to maximize your Color Computer's power and "Amdisk" it. Many software vendors have joined, and will be providing software on Amdek's 3" cartridge upon request. These software suppliers are: Cognitec; Computerware; Frank Hogg Laboratories; The MicroWorks; Tom Mix Software; Moreton Bay Software; Nelson Software Systems; Petrocci Freelance Associates; Prickly Pear Software; Saguaro Software; Skyline Marketing; The Software Station; Spectrum Projects; Star-Kits and Sugar Software.

* An additional 312 Kbytes may be accessed by manually flipping the media over.

® Color Computer is a registered trademark of Tandy Corporation.

You can purchase the Amdisk-III from any of these fine dealers:

Computerware: (619) 436-3512
Delker Electronics: (615) 459-2636
DJR Micro: (800) 732-7323
Emerald Computer: (206) 778-9826
The JIB Company: (312) 952-0299
Saguaro Software: (602) 885-6508
Skyline Marketing: (312) 286-0762
Spectrum Projects: (212) 441-9357
The Software Station: (313) 532-2550
or ask for the Amdisk-III at your local

or ask for the Amdisk-III at your local computer dealer.

2201 Lively Blvd. • Elk Grove Village, IL 60007 (312) 364-1180 TLX: 25-4786 AMDEK

REGIONAL OFFICES: Calif. (714) 662-3949 • Texas (817) 498-2334

Amdek . . . your guide to innovative computing!

-- NEW:PRODUCT\$

will you achieve success. Players use complete sentences instead of the standard two-word commands, so they don't have to play guessing games with the program. Infocom games recognize a 600-word vocabulary, including adjectives. Infidel will retail for \$49.95 (\$59.95 for some versions).

Circle No. 100 on Reader Service Card

Hurricane Plotter

The Software Connection, Inc. 5460 N. State Rd. 7, Suite 108 Ft. Lauderdale, FL 33319 (305)484-7547

The Hurricane Plotter/ Predictor program is designed for 16K tape or 32K disk systems and requires Extended Basic. It will distinguish between a tropical storm and a hurricane, and will determine, based on present course and speed, whether the storm is a danger to a given area. If the storm is a danger an alert is given and the computer will calculate when the storm is expected to hit the area. At the press of a key, once the storm has been plotted, a map shows exactly where the storm is in relation to the United States. A city symbol is relocatable for any city or area the plotter covers. The program costs \$19.95.

Circle No. 101 on Reader Service Card

Computer NEWSletter

MHN Services Inc. P.O. Box 952 Cleveland, OH 44120 (216)283-8871

The Computer NEWSletter is a guide to microcomputer information, published ten times a year. Each issue is a directory to the recent periodical literature and lists major articles from computer publications. The first issue references over 1300 articles from over eighty individual periodicals including **The**

Color Computer Magazine.

Each reference lists title and author; name, volume, date and page of periodical; a description of contents (including short abstracts when necessary); the name of the computer language involved; and a signal indicating the presence of program listings. Listings are divided under headings like Tutorials and Utilities, Games, Software Reviews, Hardware Reviews, etc. And each edition carries listings under two broad categories: articles relevant to a specific computer or group of computers, and articles of interest to all computerists. The first issue has been published in six editions: for Apple computers, for Radio Shack TRS-80 Computers, for the Color Computer, for all Commodore Computers, a combined edition for Atari, TI-99 and Timex/Sinclair Computers, and a combined editon for the IBM-PC and all other microcomputers. The Computer NEWSletter is available by subscription at the cost of \$17.50 for ten issues. Be sure to include the name and model of your computer when subscribing.

Circle No. 102 on Reader Service Card

COCO Sleuth

Computer Systems Consultants, Inc. 1454 Latta Lane Conyers, GA 30207 (404)483-1717

Computer Systems
Consultants' COCO Sleuth
disassembler system is a
derivative of Super Sleuth,
which has been available for
several years. COCO Sleuth
runs under COCO DOS and
processes object programs in
COCO DOS format,

producing COCO DOS text files. Three programs let the user examine and modify binary program files on disk or in memory, on computers with at least 32K bytes of memory and at least one disk drive.

COCO Sleuth allows many trial disassemblies before producing the final disassembly. Programs may be disassembled from disk or memory into source code format and the source may be displayed, printed, or saved on disk for later assembly. Address ranges may contain characters, hex constants, addresses, or instructions. Labels may be changed globally to labels of the user's preference. Cross reference listings of labels may be produced from any Motorola formatted assembler program, including COCO Sleuth generated programs, to assist in debugging and modification. Programs in ROM or on disk may be "altered" and saved on disk, then used to program a new ROM. COCO Sleuth is supplied as a set of 6809 object code files. The processors which may be analyzed are 6800, 6801, 6802, 6803, 6805, 6808, 6809, and 6502. It is available for \$49.

Circle No. 103 on Reader Service Card

Software Previews

Questron P.O. Box 576 So. Holland, IL 60473

Questron Software has catalog available on tape that gives you displays of most of their software. Program categories include business, utility, education, games, graphics, and music. Also on the tape is a free program (choice by category) game, utility, or "art demonstrator." It is available for \$2. A "traditional" flyer also available on request.

Saturn Printer Interface

Saturn Electronics Company Inc. 57-61 Cloverdale Blvd. Bayside, NY 11367 (212)423-4626

The Saturn Printer Interface is a serial to parallel interface for the Color Computer. It will interface with most Centronics parallel type ports and requires no power supply. It features a user adjustable baud rate from 300 cps to 9600 cps, and a user manual. All cables and connectors are provided. It comes with a one year unlimited warranty and costs \$70. Circle No. 104 on Reader Service Card

Comunications Handbook

by Alfred Glossbrenner St. Martin's Press 175 Fifth Ave. New York, NY 10010 (212)674-5151

The Complete Handbook of Personal Computer Communications by Alfred Glossbrenner shows how a computer saves you time and money. In the handbook is detailed information on CompuServe, a service that offers food coupons, fashion notes, personalized nutrition programs, The World Book Encyclopedia, advice on how to prepare for SATs and how to select a college, and more. Electronic shopping through Comp-U-Card is covered too. Comp-U-Card offers nearly 50.000 items discounted for sale to computer users. Another data base, called TradeNet, channels goods and services that are swapped. You may be able to trade any skill you have, from repairing cars to stuffing envelopes, for something like a vacation condo or a car. Yet another data base Glossbrenner discusses offers names and phone numbers from 4800 United States telephone directories, a daily index of

more

-NEW:PRODUCT\$

2000 news stories, and a magazine index that will search 600,000 citations from 370 popular periodicals. The handbook comes in paperback and costs \$14.95. Circle No. 105 on Reader Service Card

Junior's Revenge

Computerware Box 668 Encinitas, CA 92024 (619)436-3512

Junior's Revenge is for the arcade lover. Poor little Junior, a young, tireless ape, must overcome four screens of obstacles to rescue his father, the king, from mean old Luigi. He will traverse jungle and swamp, climb vines, avoid vine 'gators, dodge ZuZu birds, open locks, and conquer Luigi's hideout of vibrating pipes before he frees his big daddy. How far can you help him go? Junior's Revenge requires 32K and costs \$28.95 on cassette or \$31.95 on disk.



HJL-57 Professional Keyboard

HJL Products Inc. P.O. Box 24954 Rochester, NY 14624 (716)235-8358

A new keyboard, developed to replace the calculator-style keys in the TRS-80 Color Computer, has been introduced by HJL Products Inc. The HJL-57 Professional Keyboard is available in two models, one for the original Color Computer, and one for

the TDP-100 and F versions. The HJL is supplied as a userinstalled kit and includes: an assembled keyboard, mounting hardware, a black plastic bezel, and installation instructions. No soldering, drilling, or gluing is necessary since it plugs in and drops in place on existing mounts. With sculptured, low-profile keycaps and full-travel switch movement, the new keyboard is designed to improve typing speed and reduce data entry errors. The three-color layout is identical to the original

Color Computer keyboard. The HJL-57 keyboard also includes four softwaredefinable function keys, one of which is latchable. Switch contacts are rated for 100 million cycles minimum, and covered by a protective membrane to guard against dust, dirt, and accidental spills. The HJL-57 is warranted for one year and sold with a 15-day money-back quarantee.

Circle No. 106 on Reader Service Card

Computer **Book Catalog**

Svbex 2344 Sixth St. Berkeley, CA 94710

Sybex Inc.'s 45-page Fall book catalog is free. It lists 29 new and revised titles plus all of Sybex's current releases. The full-color catalog includes photographs and descriptions of Sybex books for the firsttime computer user through



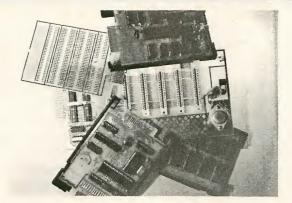
the advanced programmer. Subject matter ranges from general interest to hardware, software, operating systems, and programming languages. The catalog also includes descriptions of self-study cassette courses available from Sybex. Books and courses can be purchased at book and computer stores or directly from Sybex. Write Sybex for a free catalog, or call toll-free (800)227-2346. In California call (415)848-8233

Circle No. 107 on Reader Service Card

Com-Protect III

Com-Protect Inc. Rt. 4, Box 427X Slidell, LA 70458 (504)641-1316

Com-Protect III protects hardware from power outages, power surges, spikes, brown-outs, RF line interference, and more. It costs \$79.95.



Word-Pak

PBJ, Inc.

911 Columbia Avenue North Bergen, NJ 07047 (201)330-1898

The Word-Pak is a video board designed to plug into the expansion port of the Color Computer and provide the user with a high quality, 80-column video output. The board is compatible with most non-graphic Basic programs and can be used with disk through the use of a Y cable. Software provided with the board offers terminal

functions such as: erase to end of line, erase to end of screen, home cursor, sound bell, x, y cursor positioning, and the ability to reprogram the screen format for compatibility with other computers. Additional software support includes a Flex patch, which lets the user run standard Flex software without modification, and an enhanced version of TEXPROIII (text editor/processor). Cost is \$139.95 (a and +) or \$23.95 (bare board).

Circle No. 108 on Reader Service Card

Bio Detector

Computerware Box 668 Encinitas, CA 92024 (619)436-3512

The Bio Detector is a biofeedback system that measures galvanic skin response. Finger sensors attach to the Bio Detector box which plugs into the joystick slot of the Color Computer. Load the program, wrap the finger grips on the subject, and adjust the response level on the Bio Detector unit. The program graphs skin responses on the screen so the user can learn self-control. Watch yourself relax and get tense — graphically — and with sound. The Bio Detector comes with hardware, software, and instructions. Silver contacts give greater sensitivity and adjustable finger grips fit any subject. 16K of memory is required. The cost is \$34.95.

Circle No. 109 on Reader Service Card

==

PRODUCTS FOR YOUR RADIO SHACK

COLOR COMPUTER

Why?



MACRO-80C

The Micro Works is pleased to announce the release of its disk-based editor, macro assembler and monitor, written for Color Computer by Andy Phelps. THIS IS IT — The ultimate programming tool!

The powerful 2-pass macro assembler features conditional assembly, local labels, include files and cross referenced symbol tables. MACRO-80C supports the complete Motorola 6809 instruction set in standard source format. There are no changes, constraints or shortcuts in the source language definition. Incorporating all of the features of our Rompack-based assembler (SDS80C), MACRO-80C contains many more useful instructions and pseudo-ops which aid the programmer and add power and flexibility.

The screen-oriented text editor is designed for efficient and easy editing of assembly language programs. The "Help Key" feature makes it simple and fun to learn to use the editor. As the editor requires no line numbers, you can use the arrow keys to position the cursor anywhere in the file. MACRO-80C allows global changes and moving/copying blocks of text. You can edit lines of assembly source which are longer than 32 characters.

DCBUG is a machine language monitor which allows examining and altering of memory, setting break points, etc.

The editor, assembler and monitor — as well as sample programs — come on one Radio Shack compatible disk. Extensive documentation included. MACRO-80c Price: \$99.95

 ${\tt SDS80C}$ — Our famous editor, assembler and monitor in Rompack. Complete manual included. ${\tt Price: \$89.95}$

PARALLEL PRINTER INTERFACE — Serial to parallel converter allows use of all standard parallel printers. You supply printer cable. PI80C Price: \$69.95

MICROTEXT — Get printouts while using your modem! Also download to cassette. General purpose terminal Rompack. Price: \$59.95



Star Blaster — Blast your way through an asteroid field in this action-packed Hi-Res graphics game. Available in ROMPACK; requires 16K. Price: \$39.95

Pac Attack — Try your hand at this challenging game by Computerware, with fantastic graphics, sound and action! Cassette requires 16K. Price: \$24.95

Berserk — Have fun zapping robots with this Hi-Res game by Mark Data Products. Cassette requires 16K. Price: \$24.95

GAMES

Forth is faster to program in than Basic

Forth is a highly interactive language like Basic, with structure like Pascal and execution speed close to that of Assembly Language. The Micro Works Color Forth is a Rompack containing everything you need to run Forth on your Color Computer.

Is a Rompack containing everything you need to run Forth on your Color Computer. Color Forth consists of the standard FORTH Interest Group (FIG) implementation of the language plus most of FORTH-79. It has a super screen editor with split screen display. Mass storage is on cassette. Color Forth also contains a decompiler and other aids for learning the inner workings of this fascinating language. It will run on 4K, 16K, and 32K computers. Color Forth contains 10K of ROM, leaving your RAM for your programs! There are simple words to effectively use the Hi-Res Color Computer graphics, joysticks, and sound. The 112-page manual includes a glossary of the system-specific words, a full standard FIG glossary and complete source listing. COLOR FORTH . . . THE BEST! From the leader in Forth, Talbot Microsystems. **Price: \$109.95**

Forth is easier to learn than Assembly Language

Forth executes in less time than Basic

Adventure — Black Sanctum and Calixto Island by Mark Data Products. Each cassette requires 16K. Price: \$19.95 each.

Cave Hunter — Experience vivid colors, bizarre sounds and errie creatures in hot pursuit as you wind your way through a cave maze in search of gold treasures. This exciting Hi-Res game by Mark Data Products requires 16K for cassette version. Price: \$24.95

California Residents add 6% Tax Master Charge/Visa and COD Accepted

P.O. BOX 1110 DEL MAR, CA 92014

Also available: Machine language Monitor ★ 2-pass Disassembler ★ Books ★

Memory Upgrade Kits ★ Parts and Services ★ Call or write for information

619-942-2400

- NEW:PRODUCT\$

The bitCard

Chartscan Data, Inc. 120 South University Dr., Suite I Plantation, FL 33317 (305)473-4741

bitCards are intended to be given as gifts to friends and relatives who own or have access to a microcomputer. They are challenging text-andgraphic adventures whose themes relate to a specific holiday or event. The bitCard can be ordered customprogrammed, so that each is unique. A person who receives a bitCard as a gift will find several personal references to himself as he proceeds through the adventure. (For example, he may find his own name scribbled on a piece of paper uncovered in a locked drawer.) A bitCard draws the player into a fantasy world of which he is an integral part.

"A Christmas Adventure" will be available in early October for Christmas gift-giving. It will also be programmed to deliver a personal holiday greeting to the recipient in whatever words the sender wishes. (The sender's message will appear as part of an animated graphics scene the player's reward for successfully completing the adventure. Impatient players can jump ahead to this final scene to learn the identity of the sender by using a password.) BitCard costs \$16.95, on 16K cassette.

Circle No. 110 on Reader Service Card

The Sourcerer

Computerware Box 668 Encinitas, CA 92024 (619)436-3512

The Sourcerer is a menu driven symbolic 6809 disassembler

that produces symbolic source code that can be assembled. It is compatible with most editor/assemblers. Features include: automatic equate generation for labels and symbols outside of disassembly range; FCC, FCB, and FDB generation; 6809 machine language for speed; position independent code, relocateable to any area of memory; user defined symbol/label buffer area for

flexibility; files with or without line numbers; and symbolization of extended addresses, if desired. Also included is an apprentice program to find the start and end of machine language programs. Disassemble to disk or cassette, printer, or screen. The Sourcerer requires 16K and costs \$34.95 on cassette or \$39,95 on disk.

Circle No. 111 on Reader Service Card

FOR...NEXT (12,83)

D ECEMBER BRINGS THE SHORTEST days of the waning year and some most-welcome holidays. December will also bring the announcement of the winners of our Summer Programming Project — oh, such excitement. We've had lots of *really* interesting submissions, and we can't wait to tell you who won.

Look also for Dreidel, a Hanukah game for children, and a civil and Hebrew calendar program that will help you plan your next year. We'll have Defense! an action game, and an article that explains how to use a digital video camera.

There will be other surprises — and don't forget our regulars, either! See you then.

Advertisers' Index

Page	RS No	. Advertiser	Page	RS No.	Advertiser	Page	RS No.	. Advertiser
82	56	Aardvark	42	21	Dorsett Educational Systems	115	83	Program Store
follows	p. 64	Adventure International	63	37	Double Density	79	55	Prototech
122	87	Amdek	30	17	DSL	105	75	PSM Electronics
3	3	Arcade Animations	61	35	Duggar's Growing Systems	23	12	Quasar Animations
108	77	Armadillo	59	32	EAP	72	45	Quasar Animations
108	78	Basic Technology	50	26	Eigen	CVRIII	91	Radio Shack
127	90	Bertamax	59	31	Elite	24	13	Radio Shack
93	66	Better Software	87	63	Elite	61	34	Rainbow Connection
84	58	B5 Software	121	86	Follett Library	94	68	Saturn
76	49	CerComp	1	2	Frank Hogg Laboratory	95		Silverware
109	79	Chattanooga Choo Choo	98	70	Great Plains	97	69	Skillware
8	6	Childish Software	110	81	Green Mountain Micro	12	8	Skyline
43	22	Classical Computing	107	76	HJL	73	46	Skyline
85	59	CMD	27	14	Homebase	55	29	Softlaw
5	4	Cognitec	67	39	Interaction	69	41	Software Specialists
62	36	Color Computer News	101	72	Intracolor Communications	14	9	Software Support
48	25	ColorExpo '83	124	88	1& M	70	42	Soundworks
117	84	ColorQuest	92	64	JTJ	7	5	Spectral Associates
39	19	Color Software	70	43	Kelty Engineering	40	20	Spectrum Projects
53	28	Color Software	CVRIV	92	Leading Edge	28	15	Speech Systems
112	82	Colorware	76	48	Lighthouse Data	69	40	Star Kits
87	62	Computer Shack	88	_	Mark Data	85	60	Sugar Software
17	10	Computer Systems	9	_	Mark Data	71	44	T & D Software
CVRII	1	Computerware	103	74	Micon	78	53	Tano
84	57	Computize	99	71	Micronix	119	85	TCCM Load Tapes
37	18	Counterpoint	125	89	Microworks	66	38	T.C.E.
77	52	Data Comp	45	24	Moreton Bay	10	7	Tom Mix
77	50	Dataman	92	65	Northglenn	86	61	Tom Mix
102	73	DeePee Data	71	_	Owls Nest	79	54	Townsend
75	47	Deft Systems	58	30	Panamax	109	80	Woodstown Electronic
51	27	Delker Electronics	60	33	PBJ	44	23	Woxall Woodcraft
29	16	Derringer Software	19	11	Petrocci Associates	94	67	York 10
		3	80	_	Prickly Pear			

GIVE YOUR CHILD AN UNFAIR ADVANTAGE IN MATH



Help your child gain an advantage by using one of our classroom-tested programs in number concepts, addition, subtraction, multiplication, division, fractions, decimals & percent, pre-algebra, or one of the 15 math games that teach.

For students in grades K through 9, on tape or disk. For TDP and TRS-80 32K Color Computers with extended basic. These professional-quality programs use high resolution graphics with text and sound. They have been written by experienced teachers, tested and revised to provide high-quality and highly motivating instruction. And while you are asking, ask to see our reading and language programs as well.



ASK FOR MICRO SCHOOL PROGRAMS BY NAME at your local computer store.

BERTAMAX INC.Max Jerman, Ph.D.,
President



PERSONALIZED INSTRUCTION ON PERSONAL COMPUTERS

© 1982 Bertamax, Inc. • 101 Nickerson St., #202 • Seattle, WA 98109 • (206)282-6249

-END OF FILE-

This is my page. Dennis Kitsz and I recently debated views on computer literacy. Our orientation toward computers is different, as are our views about their proper uses. Dennis' intellectual attributes go far beyond computers and music. He is a compassionate thinker; socially concerned, and politically astute — he is also my friend. It is for these reasons that I give him my page.

- K.L., Editor

ciency rather than dependence.

Computers are not spiral notebooks or Bunsen burners. They are amorphous, flexible tools whose definitions extend as far as their creators, owners, and users want them to extend. My computers can be an extension of my writing and musical composition; used to keep my finances straight and my addresses current; used to run my recording studio and to turn on a frozen pipe alarm; used to guide my HO train set, to design my neighbor's solar garage, and provide entertainment for a neighborhood full of kids.

vial examples. It's the sort of literacy that results in self-suffi-



ine. Let's use computers for education. Let's make them fun. Let's stop the high-tech intimidation. And let's put one in front of every student. But let's not lose sight of something deliberately — almost religiously — guarded by the

user-friendly" crowd: Computers mean power. They meant power when they were room-sized behemoths owned only by governments and large corporations. Just because now they're kid-colored and priced less than a Broadway show doesn't mean they aren't power. They still are in the hands of those who know.

In September's "End of File," Kerry Leichtman treated us to a view of the educational future of computers — computers as trivial appliances no more glamorous or significant than a spiral notebook or a Bunsen burner. Computers as more doodads for the educational media stockroom.

But no, Kerry: computer literacy isn't trivial. It may be dull, it may seem alien to humanists, but it will define who has power in the next twenty years. In Rumania, where even typewriters are licensed, a paranoid government understands the significance of such technology. There it can be a revolutionary tool. Offering today's students mere "computer familiarity" is a poor and dangerous substitute for software and hardware literacy.

How can I be sure? I can't, but I become very suspicious upon seeing advertisements for businesspeople to learn how to use Visicalc — at \$895 a session. I am angered by simpleminded software worth far less than a crate of lettuce or a wheel of cheese that commands \$29.95 prices. I am disturbed by the nearly 300 letters I've received asking me how to install 64K memory in Color Computers — a task so simple (but made so frightening by warning labels) that virtually untrained Radio Shack clerks do it daily. The mystical veil must be pulled aside.

Yes, computers have represented power. The computer programmers of the past have been part of a brotherhood, an elitist and sexist group whose privacy and potency were glamorized in Space Odyssey and Fail-Safe, honored as a hallmark of corporate America, and prestigiously priced by IBM. So discouraging computer literacy (and I'll get to what I mean by that) is a vote to continue that pattern of privilege. And it's definitely not my vote.

What is computer literacy, after all? To me it's much the same sort of literacy that Americans desire for themselves in reading and writing, in hobbies, in sports and fashion. The same sort of literacy that is seldom pursued in music and art. Computer literates can understand the existence of rounding errors that affect calculations, can recover a week's worth of data lost in a blown disk directory, can program a few quick lines to solve a handful of workshop problems, can install a few extra memory circuits, can modify an expensive existing program. Literacy also provides an overall capability that is much more powerful and extensive than these few tri-

Computer literacy goes beyond the mundane into the realm of imagination and discovery. It is a tool that combines the best of Gutenberg, Morse, Bell, Edison and Marconi a synergistic combination that synthesizes their individual achievements, and is not simply counted among them. It is an extension of the discoveries of the great physicists, the great philosophers, and the great mystics. It is the technological culmination of work that began in the Renaissance, and is not to be cloaked in the harlequin raiment of "userfriendliness.'

I am often described as a hacker. It's not a description I'm fond of; it boxes me into the class of tinkerer or dilettante or weirdo, simply because I think computer literacy should include the alleviation of my human limitations through expanding the horizons of a machine. I believe in that flexibility of approach, and an economy of means — hardware, software, or simply concept.

These machines embody the calculating, robotic, and labor-saving power that humanity has dreamt of for centuries! It is as if we held in our hands a tool which transforms, on thought command, from a screwdriver to pliers to a pencil to a thermometer to a drill to a flashlight. Why, when on the verge of technological liberation, should we sacrifice the next generation's skills on an altar of misplaced egalitarianism or know-nothing appliance mentality?

I don't mean to say that computer literacy is being done right. Far from it: it's cluttered by stupid software, overblown claims, and technological confusion. Learning Basic is only one part of computer literacy, like learning notes and rhythms is only one part of knowing music. Computer literacy is at its heart conceptual — it means knowing what the machine can do, and that means understanding what the machine is capable of doing.

We Americans are notoriously lazy about our technological marvels. Specialists fix our cars, keep our TVs running, put in our plumbing, connect our electricity, take our temperatures, analyze our psychological problems, and care for our children. We have in large measure given up our responsibilities and self-sufficiency, and have become a nation of convenience addicts. Okay, so modern life is complicated ... but not so complicated that when the computer finally emerges as a powerful, economical, popular tool, we should abdicate understanding its workings because the task isn't easy.

Ten years ago, there were rumors of a computer the average person could own. There was philosophical blustering about the beginning of a new age for humankind. A few months later, the computer was a reality. I do not believe that one decade is enough time within the framework of human history to decide the fate of future generations' dealings with these kinds of machines. In fact, I believe it is precisely the right time to learn everything we can.

— Dennis Bathory Kitsz

Save \$150 on Radio Shack's TRS-80[®] Graphics Input Tablet

SALE

Reg. 349.95

19995

Input Graphics at the Touch of a Pen

Compatible with Color Computer Graphics Capability

Built-In Menu Area Simplifies Data Input





Instant Graphics with the GT-116 "X-PAD". Now you can increase the graphics versatility of your TRS-80 Extended BASIC Color Computer and save \$150 at the same time! The GT-116 X-Pad is a multi-purpose input device that reads your drawn or traced design into the TRS-80 Color Computer. It's ideal for medical, business, architectural, educational and other graphics applications.

A Breeze to Use. The GT-116 X-Pad plugs directly into your Color Computer's Program Pak™ slot (Color Computer 2 requires Multi-Pak Interface). The included cassette software provides an interactive menu for all drawing routines, plus user-defined menu functions that

simplify data input so keyboarding is minimized. X-Pad is accessed by Extended BASIC graphics commands, which are inputted right from the tablet's surface. It's also compatible with machine language routines for high-speed drawing. The drawing pen is equipped with a pressurized, leakproof standard ink cartridge that is easily changed or replaced with a stylus for tracing. Special passive tablet surface provides easy drawing and is scaled to be directly compatible with display screen size.

Hurry—Sale Ends October 24, 1983. Add the GT-116 to your Extended BASIC Color Computer today. It's available at your nearest Radio Shack Computer Center, participating store or dealer.

Radio Shack The biggest name in little computers®

A DIVISION OF TANDY CORPORATION

Prices apply at participating Radio Shack stores and dealers.

THE SECRETS OF PERFECT MEMORY: ONE AND ONE HALF EARTH DOLLARS

AT LAST: THE WHOLE TRUTH ABOUT FLOPPIES.

Amazing book reveals all!

How to keep from brainwashing your disk so it never loses it's memory.

How fingerprints can actually damage disks. Unretouched Kirlian photographs of UFO's (Unidentified Floppy Objects)! The incredible importance of making copies: the Department of Redundancy Department—and what goes on when it goes on! Powerful secret methods that scientists claim can actually prevent computer amnesia! All this, and much more . . .

much more . . .
In short, it's an 80page plain-English,
graphically stunning,
pocket-sized definitive
guide to the care and
feeding of flexible disks.

For The Book, ask your nearest computer store that sells Elephant™ disks, and bring along one and one half earth dollars.

For the name of the store, ask us.

ELEPHANT MEMORY
SYSTEMS® Marketed
exclusively by Leading
Edge Products, Inc.,
Information Systems
and Supplies Division,
55 Providence Highway,
Norwood, MA 02062. Call
toll free 1-800-343-8413,
In Massachusetts, call
collect (617) 769-8150,
Telex 951-624.

THE SEER STORY OF PARTY OF PAR

Circle No. 92 on Reader Service Card